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WHEAT, FLOUR AND BREAD, WITH SPECIAL REFERENCE TO ENRICHED FLOUR.¹

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It is well known that upon the subjects of wheat, flour and bread opinions are many and varied. The farmer, economist, politician, processor, dietitian, doctor, consumer and so on, all have their different points of view. But of all these it is the opinion of the general public, the consumer, which is of the greatest practical importance. It may not be the best-founded opinion, but in normal times it is the deciding factor. However, it is not proposed to discuss the values of these various more or less well-informed opinions, but rather to present from the point of view of the cereal chemist a review of recent developments.

Wheat is the largest of all world grain crops, yielding about 145,000,000 tons per year, and from earliest times it has commanded a leading place as food for man and beast. The grain is not a true seed, but is a fruit containing one seed, in which the fruit wall (pericarp) is fused to the seed coat (testa). Under the microscope the pericarp is seen to consist of four distinct layers of differently shaped cells which cover the testa, making five cell layers in all which completely surround the remainder of the seed—that is, the endosperm and embryo or germ. Beneath the testa a fine, transparent layer of cells called the hyaline layer and a single layer of relatively large cells packed with protein, the aleurone cells, surround the endosperm and slightly overlap the germ.

The composition of pure endosperm, germ and bran will depend upon a number of factors, the most important of which are probably the variety of wheat and the climatic conditions under which it was grown. Fleurent⁽¹⁾ has recorded the proportions of pure endosperm, germ and

bran to be approximately 85%, 2% and 13% by weight respectively, whilst Ferrari⁽²⁾ has stated that the proportion of bran may vary from 17% to 23% of the grain. From the figures reported for pure bran by Moran and Pace⁽³⁾ and from analyses made by the writer, the composition of these parts has been estimated to be as shown in Table I.

In view of the large number of varieties of wheat and of the different climatic and soil conditions under which they are grown, it is not surprising to find considerable variations in the composition of the grain. Even for Victorian "fair average quality" wheat, it is not unusual to find a 100% variation in protein content or a 300% variation in enzyme activity in any one season. The bulk of the crop, however, falls within narrower limits, and the analysis of an average sample of wheat is shown in the following tabulation:

Moisture	11.0%
Protein	11.0%
Starch (by difference)	70.0%
Crude fat	2.0%
Crude fibre	2.5%
Sugar	2.0%
Ash	1.5%

Wheaten Flour.

Wheaten flour is understood to be that portion of the endosperm recovered by the milling process. Briefly, the object of this process is to remove as completely as possible the bran and germ from the endosperm, at the same time grinding the endosperm to fine particles without excessive rupturing of the starch granules. Although milling has reached a high state of efficiency, only from 72% to 75% of the cleaned grain is obtained as flour under normal conditions; that is, about 85% of the original endosperm is recovered. Since modern milling is what is known as a gradual reduction process, flour is produced at several points within the mill. These types of flour, or more technically "flour streams", can be combined in various ways to make a series of finished varieties of flour

¹ Read at a meeting of the Victorian Dietetic Association on October 4, 1943.

TABLE I.
Approximate Composition of Wheat Endosperm, Germ and Bran (at 12.5% Moisture Content).

Part of Wheat.	Protein. (N x 5.7.)	Crude Fat.	Crude Fibre.	Ash.	Non-N Material.
Pure endosperm	9.7%	0.7%	0.1%	0.3%	76.7%
Pure germ	29.2%	13.5%	1.7%	4.2%	38.9%
Pure bran	16.8%	8.2%	14.0%	8.3%	40.2%

of different characteristics, known as "patent flour", "household flour", "clear flour" *et cetera*, or they can be combined all together to form what is known as 100% or "straight run" flour. The composition of "patent" flour most nearly approaches that of pure endosperm, whilst that of the "clear" or "low grade" flour depends upon the amount of the contamination by bran and germ particles. The "patent" varieties of flour are valued because of their superior baking qualities. In normal times the production of several grades of flour is common practice in most countries; but in Australia all the flour used for bread manufacture is of the "straight run" type, so that in this discussion the term "flour" will mean "straight run wheaten flour" for use in the manufacture of bread.

By-products of flour milling are bran, pollard and germ. Commercial bran consists of the pericarp, testa, hyaline layer and aleurone cells, together with some endosperm which it has not been possible to remove during the milling process. The pollard is a product intermediate between low-grade flour and bran, and contains such germ as is not otherwise removed. In conventional milling systems only about 15% of the germ present in the wheat is recovered—that is, about 0.3% of the wheat by weight.

The composition of these by-products as compared with flour and the wheat from which they were all made is given in Table II. It is not held that these figures are a true average for Australian products; but they are typical for one of the largest flour mills in Australia.

The analyses recorded in Table II by no means provide a complete picture of the different wheat products. Naturally, the amino acids vary in their proportions and amounts from fraction to fraction of the grain. As is well known, one feature which distinguishes wheat from all other cereals is the combination of the gliadin and glutenin of the endosperm to form gluten.

The nature and activity of the enzymes found in the various parts of the grain also differ considerably, and this is one of the reasons why efforts are made to separate the endosperm as neatly as possible from the rest of the grain. Bran and germ have by themselves no good baking properties at all. The more efficient their removal, the better the baking characteristics of the flour.

Bran lowers the loaf volume and adversely affects the loaf colour; but germ has a much more deleterious effect. It contains a compound called glutathione, which will greatly soften the gluten of the flour and also upset the fermentation system. Dr. Sullivan,⁽⁶⁾ president of the American Association of Cereal Chemists, stated last year that when amounts greater than 3% of germ, even especially treated germ, were added to flour, the resulting dough and bread were affected. Additions of 5% and over resulted in the production, in ordinary circumstances, "of inferior and abnormal bread". Recently I baked a typical bread flour with and without the addition of 6% of a commercial germ compound. The resulting bread, when

judged in accordance with an accepted procedure, scored 60% and 90% respectively.

As the miller is frequently blamed (and not always by people whose prejudices outweigh their perception) for depriving the public of minerals and vitamins by supplying white flour, it is interesting to consider briefly the reasons for the development of modern flour milling. It cannot be denied that since earliest times man has been trying to remove the husk or bran from his grain. With the tremendous advances made in mechanical engineering during the nineteenth and twentieth centuries, his efforts have been attended with considerable success. This consumer demand, which is no modern phenomenon, is, then, the basic reason for the development which has been experienced in flour milling. Sales of white flour have never been built up by means of huge advertising schemes to encourage the public to buy something it did not want. It is the public demand which built up flour sales, and which, because of increasing consumption of fruits, vegetables and prepared breakfast foods, is now lowering them. The demand was based on (i) the preference for the taste of white bread, (ii) the greater uniformity and purity of white bread, as compared with wholemeal bread as it used to be made, and (iii) the increased storage life of white flour, which became of increasing importance with the growth in populations and international trade.

Bread.

There is overwhelming evidence to show that the public of today will not eat brown or wholemeal bread in appreciable quantities if white bread is available. Only two examples need be mentioned. In the first place, pre-war surveys in England showed that the amount of wholemeal or brown bread consumed amongst the poorer classes averaged 3.5% of the total bread purchased. Amongst the wealthier consumers, who constitute a minority of the community, about 25% of the total bread bought was brown bread (Kent-Jones and Amos⁽⁷⁾). These figures indicate the unpopularity of brown bread in cases in which bread constitutes an appreciable portion of the diet. In the second place, at the end of 1941 and the beginning of 1942, it was realized in England that since the shipping losses were becoming increasingly heavy it would be necessary to increase the extraction of flour from wheat. It was proposed to raise the amount extracted from 75% to 85%. A huge advertising scheme was initiated by the Government to popularize the 85% wheaten loaf; the people even were urged as a patriotic duty to eat this bread; yet, after six months, it was represented by only 7% in the bread consumption of the country. The change-over from 75% to 85% was then made compulsory by the Government and saved 700,000 tons of imported wheat *per annum*.

In times of emergency, arguments concerning the relative merits of white and wholemeal bread spring up

TABLE II.
An Analysis of Wheat and its Products on Milling.

Sample.	Percentage of Wheat.	Moisture.	Protein. (N x 5.7.)	Crude Fat.	Crude Fibre.	Ash.	Non-N Material.	Vitamin B ₁ , γ/Gramme.
Wheat	100.0	12.0%	11.4%	2.3	2.5	1.40	70.4	5.1
Flour	72.0	13.5%	10.2%	0.8	0.2	0.40	74.9	1.9
Bran	13.9	13.2%	14.6%	2.6	9.2	4.30	56.1	10.2
Pollard	13.8	12.0%	14.8%	4.6	6.4	2.90	58.3	14.6
Germ	0.3	12.0%	25.8%	10.2	2.2	3.90	45.9	28.2

⁸ The protein of products used for stock feeding is usually expressed as N x 6.25, in which case the protein of the bran, pollard and germ would be 16.0%, 16.25% and 28.3% respectively, and the non-N material would be correspondingly reduced.

like weeds after rain. In view of the amount of information made available by modern research, there should no longer be any serious differences of opinion on this subject. Yet there are still people who, if they had their own way, would force us all to eat 100% wholemeal bread. Such being the case, a few comments on this matter may not be out of place. It is not proposed to enter into a detailed discussion of the composition of wholemeal and white bread; these figures are readily available (McCance and Widdowson,⁽⁶⁾ Marston⁽⁷⁾), but rather to mention one or two points which frequently do not receive much publicity. The question then is, what would happen if we changed from white to wholemeal bread?

In the first place, it is not generally known that the wheat blend used in the manufacture of wholemeal is stronger than that used for the manufacture of white flour. Now, there would not be sufficient strong wheat, in Victoria at least, to maintain the present strength level of the wholemeal wheat blend. Consequently, the wholemeal loaf would be more difficult to make and would be even less attractive than at present.

Secondly, wholemeal is much more difficult to store, partly because it becomes rancid after a short period as compared with white flour, and partly because it is much more subject to insect and bacterial infestation. This would lead to wastage and almost certainly to "off" flavours in the bread sooner or later. This, in turn, would lead to a decreased consumption of bread—a move in the wrong direction even if considered only from the dietetic point of view, since bread constitutes one of the most important energy-yielding foods.

Thirdly, no bran or pollard would be produced. That would mean the absence, in this State alone, of 180,000 tons per year of animal foodstuffs of an average protein content of between 15% and 16%. Bran and pollard are used for the feeding of poultry, pigs, cattle and horses, and occasionally under drought conditions for sheep. But if it were all fed to dairy cows, the amount of milk equivalent to 180,000 tons of bran and pollard would be 72,000,000 gallons. It is not suggested that if the consumption of 100% wholemeal bread became compulsory, there would be an immediate reduction in eggs, milk, and meat equivalent to the amount produced from 180,000 tons of bran and pollard; but it would be necessary to find animal and poultry foodstuffs of equivalent nutritional value in order to maintain consumption of these protective foods at their present level, and ground cereals would not be good enough. The reduction in milk, eggs and meat would correspond to the degree by which the substitutes fell short of the nutritional value of the 180,000 tons of bran and pollard, and probably would amount to between 15% and 20%.

In England during 1917 and 1918 there was a reduction in milk supply of 25% for a time which coincided with the period of increased flour extraction (92%). The Astor committee of investigation attributed the reduction primarily to a shortage of concentrated feeding stuffs, including milling by-products.

A comprehensive comparison of the dietetic values of wheatmeal *versus* white flour *plus* milk was published by Dr. N. C. Wright⁽⁸⁾ in August, 1941. This paper was followed by one entitled "Our Bread and Milk" by A. L. Bacharach⁽⁹⁾ in November of the same year. In both

instances the wheatmeal considered was of 85% extraction. Briefly, both authors showed that the change from white flour to 85% wholemeal flour, with the diversion of the corresponding bran and pollard from the dairy cow to the loaf of bread, involved nutritionally significant losses of Calories, animal protein, calcium, riboflavin, ascorbic acid and vitamin A. On the other hand, it involved large and dietetically significant gains of iron, vitamin B and nicotinic acid. I believe that to change from white flour to 100% wholemeal flour would show proportionately greater gains. In any case, it is not possible to decide, on nutritional grounds alone, which policy is to be preferred, because, for example, a gain in iron or vitamin B, would obviously not compensate for a loss in calcium or riboflavin.

Irrespective of the problems attached to the decrease in bran and pollard supplies, there are other factors which are of importance when one is considering increasing the extraction of flour from wheat. These, no doubt, are more familiar than were perhaps the three points just outlined. The digestibility decreases from 96% for white bread to 87% for wholemeal bread (Macrae, Bacon, Hutchinson and McDougall,⁽¹⁰⁾ Snyder⁽¹¹⁾), so that a little over 10% more of wholemeal bread would be needed to supply the same amount of energy as white bread from the same wheat.

The biological value of the protein is generally believed to improve with increased extraction, and when these proteins furnish practically the sole source of protein in the diet, this belief is valid. In a mixed diet, even of a plain character, however, Robertson,⁽¹²⁾ in a review of recent literature, concludes that white flour proteins (as white bread) have a greater biological value than the proteins of higher extraction flour (as bread). The protein digestibility is clearly in favour of bread from white flour. Macrae, Bacon *et alii*⁽¹⁰⁾ show the digestibility of protein as 91% for white bread, 85.3% for fine wholemeal bread and 85.7% for coarser wholemeal bread.

The ratio of vitamin B₁ to the fat-free calorie value of food is of importance (Clements *et alii*⁽¹³⁾), so that the greater the intake of carbohydrates, the greater the need for vitamin B₁. Bread supplies a considerable proportion of the calorie intake, especially for the poorer classes of the population; consequently many nutritional experts base their plea for the substitution of wholemeal for white bread upon the admittedly greater content of vitamin B₁ in the wholemeal. This is an important point and merits close attention. Firstly, although the vitamin content increases as the flour extraction approaches 100%, not the same increase is shown in the corresponding bread. This is due mainly to the greater destruction of vitamin B₁ in the baking of wholemeal bread. According to Dawson and Martin,⁽¹⁴⁾ this baking loss of vitamin B₁ in wholemeal bread is nearly double that in white bread. By the use of the results obtained by Dawson and Martin, the author has calculated the vitamin B₁ content of bread from a series of flours of varying extraction which he prepared and analysed. These figures are given in Table III. They show that, although the ratio of vitamin B₁ content of the wholemeal to that of the normal flour is as 3.21:1.0, the ratio for the corresponding bread is as 2.54:1.0. The net gain is, therefore, much less than would be expected merely from a consideration of the analysis of various types of flour and meal.

TABLE III.

Variation in Composition with Increase in Extraction from Wheat and Calculated Net Vitamin B₁ Content of Resulting Bread.

Sample: Percentage of Wheat. ¹	Protein. (N x 5.7.)	Fibre.	Ash.	Vitamin B ₁ .		Amount of Sample Used per Pound of Bread. (Ounces.)	Vitamin B ₁ Lost on Baking.	Vitamin B ₁ in Bread. International Units per Pound.
				γ per Gramme.	International Units per Pound.			
74.5 (normal flour)	9.80%	0.16%	0.39%	1.4	212	11.25	19.5% ²	120
79.5	10.15%	0.46%	0.52%	2.4	363	11.0	23.0%	193
85.0	10.54%	0.87%	0.71%	3.7	560	11.0	27.0%	281
100.0 (wholemeal)	11.94%	2.54%	1.25%	4.5	681	10.8	35.0%	305

¹ Based on wheat cleaned for milling.

² From the paper by Dawson and Martin⁽¹⁴⁾; the other figure is an interpolation

Although the analysis of only one series of types of flour is shown in Table III, the results are of the same order as those obtained from other series tested and are comparable with other published figures. Secondly, providing further work supports the findings of Dawson and Martin, it may also be concluded from Table III that no dietetically significant increase in vitamin B_1 intake is brought about by the consumption of wholemeal bread instead of bread from 85% extraction flour. Thirdly, it has been established without doubt that as the extraction is increased the digestibility is significantly lowered, so it is reasonable to suggest that possibly the absorption of vitamin B_1 by the body is lower in the case of the wholemeal bread than in that of the white bread.

Wholemeal bread is sometimes advocated in place of white bread because it contains more minerals, vitamins and roughage. According to ordinary chemical analysis this is undoubtedly true, and it has been mentioned already that wholemeal provides greater amounts of available iron, vitamin B_1 , and nicotinic acid. If the bran and pollard question is ignored, wholemeal bread also gives greater amounts of riboflavin than does white bread. But wholemeal bread is not necessarily the better because it contains a greater amount of minerals and roughage. It contains much greater amounts of phytic acid phosphorus—77.0 as against 4.0 milligrammes per 100 grammes—so that not only the calcium in the wholemeal bread, but also some calcium in other parts of the diet, is rendered non-available to the system (Kent-Jones and Bacarach⁽¹⁰⁾). On the other hand, white bread contributes available calcium to the diet. The greater amounts of magnesium in wholemeal complicate the evaluation of this reaction, and in fact the calcium loss is sometimes ascribed to the unfavourable calcium-magnesium ratio. There seems to be as much opposition to, as support for, wholemeal on account of its fibre or roughage content, as is shown by the following quotation from a leading article in *The Lancet*⁽¹¹⁾ in 1940:

The disadvantages of wholemeal are that it is difficult to store, it contains little calcium, its calcium to phosphorus ratio is 1:7, whereas the ratio should be 1:1 or 1:2, and it contains phytates which conduce to rickets. Its deficiencies must be made good by extra milk and cheese and possibly a good source of vitamin D such as cod-liver oil. Of course, wholemeal contains roughage, whereas white flour does not, and some have held this to be a reason for preferring wholemeal to white. But not everyone needs roughage in the diet. In fact to some it is a thing to be avoided, and were the Government to insist on an 80 per cent to 90 per cent extraction of the grain, as it did in the last war, the coarseness of the bread would again cause alimentary disturbances to those to whom roughage is anathema.

The developments that have taken place recently in various countries reflect the complexity of our subject. It need scarcely be emphasized, however, that decisions have been more often dictated by circumstances than governed by choice. Every country at war has realized that it cannot afford to have any significant proportion of its population undernourished. The various governments are, therefore, making strenuous efforts to ensure that the people are adequately fed. They are, it is feared, actuated more by consideration of national expediency than by any sense of moral values. Fortunately, the tremendous increase in nutritional knowledge during the past few years is helping to shift the emphasis from food as a trade commodity to that of food for human welfare. It is to be hoped that this emphasis will persist after the conclusion of the war.

When the question of improving the value of the national diet was raised, bread received immediate attention. It is cheap, nearly everybody eats some of it, and it lends itself to relatively simple control. In England it was decided very early in the war to make compulsory a flour extraction of 75% and to add 0.2 gramme of vitamin B_1 per sack (280 pounds) of flour. The white flour averaged a little more than 180 international units per pound of vitamin B_1 , and the addition increased it by nearly 240 international units per pound, so that the content was

brought close to 420 international units per pound. It was also made compulsory to add 7.0 ounces of calcium carbonate to each sack of flour (the equivalent of 45 milligrammes per 100 grammes). Before this scheme covered more than a medium proportion of the flour, the U-boats compelled a tightening of the belts and a lengthening of the flour extraction to 85%. At this figure additions of thiamin were considered unnecessary; but the Accessory Food Factors Committee of the Medical Research Council recommended that the addition of calcium carbonate be increased to 14 ounces per 280 pounds of flour. This recommendation was not followed by the British Government. Today the British national loaf is made from 85% wheat-meal milled to definite specifications with regard to fibre and vitamin B_1 content, to which have been added barley and/or oat products and rye, milk powder (two pounds per sack) and calcium carbonate (seven ounces per sack). In addition, the baker has the option of adding potatoes and potato flour to the extent of 3%. On odd occasions a small amount (7% to 10%) of long-extraction Canadian flour is also included. Over the past twelve months the quality of the bread has decreased, but the nutritional value has slightly improved. Of 381 samples recently examined by the Scientific Adviser's Division of the British Ministry of Food, only 29% were placed in the highest quality grade, which itself was merely rated "good".

The figures in Table IV are taken from the third report presented by the Division,⁽¹²⁾ those in brackets being the corresponding percentages for 459 samples examined during the previous year. As far as can be ascertained, the British national 85% flour contains on an average about 1.00 international units per gramme (that is, 454 international units per pound) of vitamin B_1 , and 1.5 international units per gramme of riboflavin (0.68 milligramme per pound). No report of the figures for the actual bread has been seen.

TABLE IV.

Quality.	Number of Loaves.	Percentage.
Good	112	29 (61)
Fair-good	90	26 (22)
Fair	117	31 (13)
Poor	53	14 (5)

In Canada the official attitude towards the enrichment of flour and bread by means of pure vitamins is one of opposition. Indeed, enrichment is prohibited, except for such flour as is shipped to England. The Canadian Government passed an Order in Council effective on April 1, 1942, specifying and providing for the manufacture of two government-approved types of natural high-vitamin flour. They are vitamin B white flour (Canada Approved), of minimum thiamin content of 400 international units per pound, and vitamin B flour (Canada Approved), essentially a whole wheat flour, possessing 550 international units of vitamin B_1 per pound. The first of these represents essentially a 75% to 79% flour extraction. No restriction has been placed on the manufacture of the normal baker's flour, so that the public has a free choice. In spite of heavy advertising pressure by the Canadian Government, including hundreds of thousands of pamphlets praising the new loaf which were distributed to householders, the present consumption of the "approved" vitamin bread represents only 21.8% of the total bread sold, and according to A. W. Alcock,⁽¹³⁾ this 21.8% is equivalent to less than 10% of the total Canadian flour consumption. These figures speak for themselves, and since the Canadian Department of Pensions and National Health has stated that the thiamin deficiency of the diet is so great that it could not be corrected even by the complete substitution of whole wheat for white flour, it appears as though the measures adopted are only of a stop-gap nature.

In America, the official attitude today is that flour and bread enriched with minerals and vitamins provide a sound basis for improving national nutrition. From the American point of view this is probably the most logical

attitude. The Americans realize that the use of longer extractions would not correct existing deficiencies, whilst it would completely upset the structure of their milling and associated industries. Moreover, it would be most unpopular with consumers. On the other hand, they are fortunate in possessing a huge chemical industry which is able to supply pure vitamins at an acceptable price.

A United States Federal Standard for enriched flour was promulgated nearly three years ago, and in some States only enriched flour and bread are permitted today. Practically all United States Army flour purchases are of enriched flour, and it is estimated that at least 35% of all commercially baked bread is now enriched. Out of 400 odd commercial flour mills belonging to the Millers' National Federation, only six or eight are not enriching at least some of their flour.

In July of this year notice was given that an order to take effect on October 1, 1943, was being prepared, requiring enrichment of all flour at the point of milling. At the public hearing of interested parties on the proposed order on August 3, the main arguments did not concern enrichment as such, but hinged on the question of whether or not the baker should have some control over the enrichment procedure. The proposed standards, expressed as milligrammes per pound, so far as they refer to the mineral and vitamin content of enriched flour and bread, are given in Table V.

TABLE V.

Ingredients.	Enriched Flour.		Enriched Bread.	
	Minimum. (Milli- grammes per Pound.)	Maximum. (Milli- grammes per Pound.)	Minimum. (Milli- grammes per Pound.)	Maximum. (Milli- grammes per Pound.)
Required Ingredients:				
Thiamin ..	2.0	2.5	1.1	1.8
Niacin ..	16.0	20.0	10.0	15.0
Riboflavin ..	1.2	1.5	0.7	1.6
Iron ..	13.0	16.5	8.0	12.5
Optional Ingredients:				
Calcium ..	500	1,500	300	800
Vitamin D (U.S.P. units) ..	250	1,000	150	750

In view of the recent publicity given to wheat germ, it is interesting to read the views of the United States Food and Drug Administration on the subject. In the proposed standards for enriched bread, wheat germ is permitted only to the extent of the maximum which "may be present as a result of the use of enriched flour". This amount is likely to be negligible. The findings of the United States Food and Drug Administration with regard to wheat germ, as reported in *The Northwestern Miller*,⁽¹³⁾ are as follows:

The testimony as to the benefits from the use of small amounts of wheat germ in white bread (1½ to 2 per cent. by weight based on flour weight) is not convincing. On the other hand, there was evidence establishing that the use of processed wheat germ in white bread has led to labelling and advertising claims based on its vitamin and mineral content, such as would likely confuse consumers with respect to identity and relative nutritive properties of bread and enriched bread.

This refers to the use of wheat germ in white bread, and not to the use of wheat germ in large amounts in some special bread. It is presumed that the latter will be allowed to continue, provided that no false claims are made with regard to its nutritive value.

Now last, but not least, what is the position in Australia? In November, 1941, the Nutrition Committee of the National Health and Medical Research Council⁽¹⁴⁾ reported that there was some evidence which suggested the presence of vitamin B₁ deficiency to a minor degree in some Australian individuals. This committee also stated that further investigations might reveal more extensive vitamin B₁ deficiency than was at the time evident, and that ultimately more definite steps might have to be taken to correct any vitamin B₁ deficiency in the diet of sections

of the population. Since that time, certain alterations to the diet have been enforced through rationing of certain foods (for example, sugar), which may have caused indirectly a slight improvement in the vitamin B₁ intake. As against this, there have occurred huge shifts in population towards industrial areas and tremendous increases in the demands on the physical and nervous strength of the people due to the war. It is possible that as a result there is a deficiency of vitamin B₁ in the diet which, even if not serious, would be better removed. There are no chemical industries in Australia capable of supplying pure vitamins, apart from ascorbic acid, at a reasonable price, though this may not always be the position if the need is established. At present, however, the chances of enriching our flour with pure vitamins and minerals seem remote.

To increase the extraction of flour by modifications in the milling process is not so simple as it often appears to those unacquainted with the industry. Two things are prerequisite, machinery and manpower, both of which are in short supply. In any case, the writer is not in favour of increasing flour extractions beyond 80% of the wheat, and this alteration would result in only a 10% to 15% overall increase in vitamin B₁ intake, provided that bread consumption remained at the present level. Britain certainly has increased the flour extraction to 85%, but it must not be forgotten that she is more than compensating for the drop in home production of butter, milk, eggs and cheese due to the consequent reduction in bran and pollard supplies, by importations from various countries, including Australia. By increasing our flour extraction we should reduce the amount of available feedstuffs, and therefore would not be able to fulfil our export commitments of the protective foods.

A further important point concerns Australia's present export of white flour. Once alterations are made to the milling system in order to produce a long extraction flour, it is not easy to change back to white flour production. The dietary habits of a food-exporting country such as Australia are inevitably bound up with the dietary habits of the importing countries, for any sudden alteration in either may upset established trade practices. If this resulted in a decrease of our exports, it might lead eventually to a lowering of the standard of living here. Any dietary change which tended to produce a move in this direction would be nutritionally unsound.

If a vitamin B₁ deficiency is shown to exist in the diet of any significant proportion of the people, not just in the "average" diet, it appears as if the best immediate recommendation is to eat more bread of whatever type is naturally preferred.

Summary.

1. The "average" wheat is nearly as rare as the "average" man. The composition of wheat varies appreciably; consequently it is not satisfactory to compare the nutritive value of wholemeal and white breads, unless both types of bread are derived from the same wheat blend and unless the actual composition of each is stated.

2. The composition and nutritive value vary considerably with different portions of the grain, and as the extraction of flour from wheat is increased, so is the fibre content increased, with a resulting decrease in digestibility.

3. Although the vitamin B₁ content of long extraction flour and wholemeal is considerably greater than that of white flour, the differences are not so pronounced in the corresponding types of bread, because the baking loss of vitamin B₁ increases with increase in extraction.

4. Any increase in flour extraction must be accompanied by a corresponding decrease in mill by-products (pollard and bran). A decrease in supplies of bran and pollard would entail some reduction in the present quantity of the protective foods—milk, eggs and butter.

5. If the national extraction of flour is increased, then calcium must be added, in order to offset the harmful effects of increased phytic acid phosphorus.

6. There is sound evidence to show that the present system of flour milling and bread manufacture is the most economical, and when all things are considered probably shows the best utilization of the wheat grain from a

nutritional point of view. Even if in the public interest it was considered necessary to raise the present level of flour extraction in order to increase the intake of vitamin B₁, the extraction, in the writer's opinion, should not be greater than 80%.

7. The use of wheat germ to increase the vitamin level of white bread is impossible on a national scale. In any case, its use entails special care in the bakery.

8. The civilian consumption of white bread is about nine or nine and a half times that of brown or wholemeal bread, and propaganda alone will not change this ratio. Since a man who joins the army does not change his food preferences when he changes into a uniform, it is presumed that this ratio also holds for the services. As these food preferences are strongly established, any effort to change them forcibly without adequate propaganda is always resisted and generally leads to discontent and trouble.

9. Conditions in Britain today are such that the position with regard to bread cannot be taken as a fair example when dietary alterations here are being considered.

10. In Canada, the use of a long extraction flour which must comply with a government specification is optional. It is not proving very popular, and at best it is only a dietary "stop-gap" measure.

11. In America, bread is one of the foodstuffs chosen as a means of improving the nation's dietary standard. It is being enriched with vitamins and minerals to a level which in some respects is considerably higher than that of whole wheat. It is anticipated that the cost of this enrichment will be one-tenth of the value of the present drug store sale of the same vitamins and minerals.

12. In Australia, no steps have been made in this direction, because there is insufficient evidence of vitamin deficiencies in the national diet. This does not necessarily mean that they do not exist, but it may reflect on the adequacy of the nutritional surveys.

13. If at some future time deficiencies are proved to exist in the diet of any significant proportion of the people, and if flour is chosen as a means of correcting those deficiencies, then enrichment with minerals and vitamins as is carried out in America would be the procedure most suited to Australia. Failing this, the best recommendation would be to increase the consumption of bread, of whatever type is naturally preferred.

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SEMINAL VESICULITIS.

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THE opinions of genito-urinary clinicians vary greatly as to how far the seminal vesicles are involved in any infection of the male adnexæ. The clinical picture is so obscured by the coincidental infection of the prostate that it is difficult to be certain whether extension to the vesicles has taken place. Certain clinical and microscopic appearances, however, should guide one in estimating progress of events in this direction. It is decidedly important, in my opinion, to make such a decision, since, like other dead-end organs, notably the appendix and the gall-bladder, given some fibrosis at the exit of the vesicle, it might be expected to retain such infection indefinitely. Hence the following description.

Acute Vesiculitis.

Acute vesiculitis is always accompanied by acute prostatitis, which may be the primary condition; for example, swollen prostatic tissue can obstruct the ejaculatory ducts and favour retention of organisms.

Ætiology.

Acute vesiculitis, or alternatively prostatovesiculitis, may be due to (i) hæmatogenous infection, (ii) ascending infection from the anterior part of the urethra, or (iii) exacerbation of a latent chronic vesiculitis that has originated from either (i) or (ii).

The organisms are various. The gonococcus, if present, has always ascended from the anterior part of the urethra. Staphylococci and *Bacillus coli communis* are common, and may result from either a hæmatogenous or an ascending infection. Tuberculosis is occasionally the cause of acute inflammation, but in this case the vesiculitis is more likely to be one of the exacerbation types; like other visceral infections with the same organisms, it is a hæmatogenous one. The trichomonad infection is not so rare as may be supposed. Presumably it is usually due to the *Trichomonas vaginalis*; but one can credit the *Trichomonas intestinalis* (if there is a difference) as an occasional offender. I am sure that in many men the urethra becomes temporarily infected with the trichomonas, which, after setting up an inflammation to be carried on by secondary organisms, quickly disappears from the field. Possibly it requires a more acid medium in which to thrive, although occasionally the vesicles, with a pH of over 8.0, will give it permanent sanctuary. I have good reasons for these assertions, but space does not here allow of their amplification.

Symptoms and Signs.

The symptoms and signs are as follows. Pain is present most characteristically in one or both groins, tending to radiate to the iliac fossæ and even into the loins; it is also felt in the crutch and rectum, but that fact does not distinguish it from that of prostatitis, though in vesiculitis rectal pain may be unilateral. Tenderness is present in the above-mentioned regions, especially the iliac fossæ and rectum. Pyrexia occurs and is seldom accompanied by rigors as in renal infection, and does not distinguish the condition from acute prostatitis. However, pyrexia of this type occurring during the course of an attack of apyrexial prostatitis should suggest either an abscess or vesiculitis. The urinary symptoms depend entirely on contiguous inflammation at the bladder neck. Swelling of the adnexæ is felt *per rectum* to a greater or less degree. Frequently a mass that appears to be a generalized enlargement of the prostate, with obliteration of the median sulcus and interlobar notch, is encountered as soon as the finger passes the anal canal; it quite obstructs the finger's further passage, or necessitates a difficult negotiation of its borders. The vesicles are always involved in this process, and as the swelling subsides it will be found to resolve into a vesicular enlargement or perivesicular lymphangitis.

The Diagnosis.

Acute appendicitis among other abdominal conditions must be considered in the diagnosis. In vesiculitis, however, the abdominal tenderness is not so pronounced, is situated lower and is unaccompanied by rigidity or hyperæsthesia, whilst on examination *per rectum* swelling and tenderness of the adnexæ may be apparent. If the vesiculitis is less acute, so that light massage of the vesicles is possible, the expression of a little secretion and its immediate examination as a wet film will disclose polymorphonuclear leucocytes and usually red blood cells. Microscopic examination of the urine may or may not help; but a moderate number of abnormal cells in the specimen would be suggestive of genital inflammation. Acute appendicitis arising in the course of acute urethritis may present difficulties. In a case of my own my orderlies had diagnosed appendicitis quite correctly before I had.

Renal colic may be simulated. Actual colic is rare in vesiculitis, though it may occasionally arise from two causes—(i) obstruction of the ejaculatory ducts, causing a true vesicular colic, and (ii) a congestive swelling of the lower end of the ureter, occasioned by the crossing of the inflamed vas. In either case, however, the evidence *per rectum* of the inflamed vesicles would suggest the origin of the pain. The pain of vesiculitis is usually less spasmodic than that of renal colic, and is unaccompanied by vomiting.

When epididymitis supervenes, as it so often does, the differential diagnosis is easy. I have heard it stated that frequently the first symptom of epididymitis, even before the testicular swelling, is pain in the groin. This preliminary groin pain I assume to be always due to acute vesiculitis, to which the epididymitis is secondary. Indeed, I am of the opinion that almost invariably epididymitis is secondary to vesiculitis of the same side, and conversely, that a diagnosis of infective epididymitis is questionable if the vesicle is found to be free of infection.

Chronic Vesiculitis.

The ætiology and bacteriology of chronic vesiculitis are the same as those of the acute condition. The signs and symptoms are as follows. Pain or discomfort in the groin is probably the most characteristic. More rarely, testicular pain occurs, which is essentially vesicular in origin (see Case IV). Pain in other sites, such as the perineum and sacrum, is not more pathognomonic of vesiculitis than of prostatitis.

Hæmospermia may be present. Gross amounts of blood in the semen may arise from any congestive condition in the posterior part of the urethra and adnexæ. Although it is not pathognomonic of vesiculitis, this condition is usually present.

Palpable fibrosis of the vesicles and lymphatics leading from them into the posterior pedicles may be found *per rectum*.

The well-defined conditions described above are easily diagnosed. There are, however, other infections with organisms of low virulence, in which no subjective or objective signs are referable to the adnexæ. It is more than ever difficult to decide in these cases how much of the pathological state is to be found in the prostate, and how much in the vesicles. It is mainly because prolonged treatment of the prostate fails to clear up the trouble completely that attention becomes focused more directly on the vesicles. The wet films of the prostatic-vesicular secretion continue to contain large clumps of degenerated cells, which, for reasons given below, I regard as peculiarly vesicular in origin. Here is a clinical picture of such a case. A little moisture may be discovered at the external meatus by the patient himself or by the medical officer at a "short arm" parade. In these mild cases the consultant must often practise patience in order to obtain a smear, and when it has been obtained, the microscope may reveal only sparse polymorphonuclear and epithelial cells, with an absence of microorganisms, or with the usual flora of the urethra. Anterior urethroscopy gives negative results; *per rectum* one feels no abnormality, and the stained smear of expressed secretion may contain only a few polymorphonuclear cells, a negligible finding in itself. In fact, all the foregoing findings may be considered negligible. The condition may even be thrown into one of the garbage cans reserved for clinical entities that cannot be placed in any scientific category and labelled "non-infective urethritis due to masturbation", or perhaps, with less originality, "a strain".

The most definite evidence of inflammation in these cases is to be found in the wet film. This reveals the clumps of cells which will later be described. Case III in its early manifestations illustrates this type, but later depicts a recrudescence to the acute type described earlier.

Diagnosis.

In diagnosis chronic lower abdominal conditions may have to be eliminated, the procedure being much the same as in acute conditions. In most cases varicocele, however large, produces few recognizable symptoms until the recruit's attention is drawn to it by the examining medical officer. But in my experience the small varicocele that is hardly recognizable by palpation will occasionally cause quite distressing groin pain. Examination of the wet film again eliminates the possibility of vesiculitis.

Complications.

There are various complications of chronic vesiculitis, amongst them acute exacerbations, with or without epididymitis. Fibrositis and arthritis, also uveitis and other rarer metastatic conditions, occur more frequently in the gonococcal infections, and one form of fibrosis—namely, the painful plantar type—seems to be peculiar to the gonococcal infections. The vesicles are always at fault in these cases; it is useless, for instance, to attempt the cure of a painful *pes planus* before energetically eradicating a chronic vesiculitis, and the same dogmatic statement will apply to any proven gonococcal metastasis. Vague fibrositis and arthritis occur, however, with non-specific types of vesiculitis just as frequently as from other foci of sepsis in the teeth, tonsils and sinuses. It would be an interesting piece of research to investigate the condition of the genital adnexæ of all repatriated soldiers given pensions for some form of "rheumatism". I doubt whether any search now made for foci of sepsis ever extends as far as the genitals, except when it is made by exceptional investigators. I feel certain at least that many men must enter the army with chronic vesiculitis, and that even then the deposition of fibrous tissue around their lumbo-sacral vertebrae and lumbo-sacral nerve cords has commenced; for this they will later receive pensions from the nation.

The fallacy about urine examination of recruits is that it is left to orderlies. The presence of debris or threads is never mentioned by these orderlies, so far as I know;

unless there are obvious reactions to tests for albumin or sugar, the slip appended to the D1 form is invariably marked "N.A.D." In a certain percentage of cases, at least, the finding of debris would lead to an investigation of the adnexæ.

The Wet Film.

Massage of the prostate and seminal vesicles *per rectum* expresses secretion that can be collected at the external meatus as a drop on a slide. A cover slip is immediately placed on the drop, excess fluid is absorbed by means of a blotter, the cover being lightly compressed in the process, so as to ensure uniformity in the thickness of the films and so facilitate comparison. The bladder should be empty before massage, partly to wash cells out of the urethra, but mainly to ensure relaxation of the external sphincter. A full bladder tends to maintain firm closure of this sphincter, so that the secretions may run back into the bladder rather than forward into the anterior part of the urethra. By means of a four millimetre objective and a "10X" eyepiece, the diaphragm being half-closed, the secretion is examined as soon as possible.

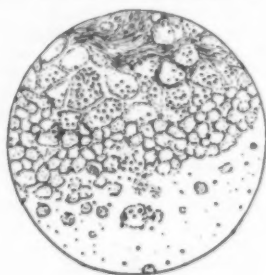


FIGURE I.

Edge of a large clump, showing polymorphonuclear cells mostly at the periphery, fibrillated secretion towards the centre, one large cell separated and apparently shedding granules.

Normal prostatic secretion is thin and opalescent, and if it is examined as described, it is found to contain fine lipid granules scattered through a non-cellular field. (I am aware that the chemical nature of these granules is disputed.) Mostly they are small granular specks, but some may approach the size of a lymphocyte. One should make certain of these granules, which are usually seen moving across the field, in order to distinguish the droplet from urine. Sometimes round or oval laminated bodies are seen, which are probably *corpora amyacea*.

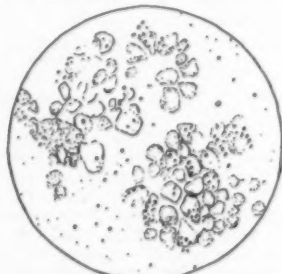


FIGURE II.
Small clumps.

Normal vesicular secretion to the naked eye is thicker, of a more gruel-like consistence, than prostatic secretion. Even though it may not appear in the film macroscopically, some is usually present mixed with the prostatic secretion, unless the ejaculatory ducts are quite stenosed. Microscopically, in the undried film, normal vesicular secretion tends to assume a floccular appearance, and is non-cellular, except for the spermatozoa that may be entangled therein.

Dead spermatozoa are then the usual finding, if sperms are present at all. Necrospemia in fluid massaged from the adnexæ is not an abnormal finding, though it is so in the freshly ejaculated specimen.

Abnormal vesicular secretion may be macroscopically indistinguishable from normal secretion. Gross blood-staining or greenish yellow pus is easily distinguishable; occasionally tenacious or semi-solid masses may suggest a cast of the ampulla or vesicles, a condition often described but only occasionally seen in chronic vesiculitis. The examination of the expressed secretions in the urine or bladder washings passed after massage is frequently resorted to by some clinicians for evidence of vesiculitis; I confess that such examination has never conveyed anything to my mind, since I have never been able to correlate my own and others' interpretations with the microscopic appearances. Microscopically, the expressed abnormal secretion may assume a more viscid and fibrillar appearance; it contains polymorphonuclear and larger cells of various shapes and sizes, often full of granules, but otherwise transparent and anuclear. Frequently these cells are to be found in clumps, throughout which polymorphonuclear leucocytes are scattered, though mostly at the periphery of the clumps. The central part or nucleus of a clump is very interesting. It may vary from an ill-defined mass of large cells, so degenerated as to have almost lost all outline, to the fibrillated secretion described; but it is often represented by a plastic, amorphous plaque of a brownish colour, with radially split

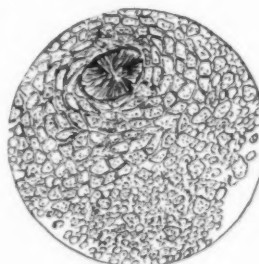


FIGURE IIIA.

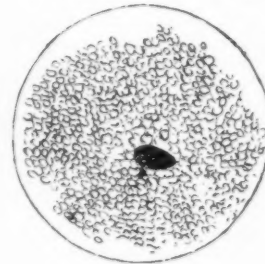


FIGURE IIIB.

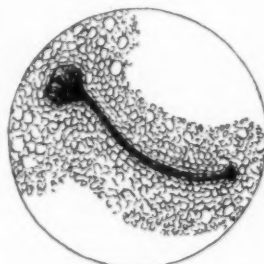


FIGURE IIIC.

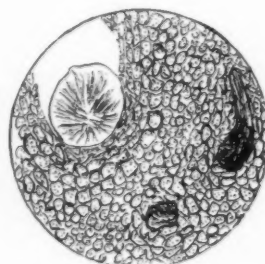


FIGURE IIID.

Diagrammatic representation of clumps.

edges—much as a small globule of clay would split on being compressed to a disk. One occasionally finds such a nuclear plaque extending into an elongated tail, which must be followed through many fields, and which ends finally in a smaller expansion. This cast-like tail certainly represents the contents of a duct of a considerable lumen, larger and longer than that of a prostatic tubule (Figure IIIC). The margins of each clump, if not broken up or compressed into each other, have a definition that denies a fortuitous grouping under the cover slip, the whole clump suggesting a compressed globule.

The whorl-like arrangement of such clumps may present a pleasing appearance; they usually appear as concentric circles (diagrammatically portrayed in Figures IIIA and IIIB); but occasionally they are radially packed like the seeds of a sunflower, as in Figure IIID. Such an arrange-

ment is more likely to be polymorphous. Examination of a packed film may reveal a number of these clumps compressed together, each with its separate nuclei of amorphous debris or plastic material, whilst the peripheries are blended with each other (Figure IIIb).

A good description of these larger cells in genito-urinary and histopathological literature is hard to find. I do not suggest that other clinicians have failed to notice them; most likely, like myself, many have observed them, and for years have made their own silent deductions. On the rare occasions when the wet film is mentioned, attention is called to the polymorphonuclear cells; other cells are ignored, or are stated to be prostatic in origin, though in some cases they preponderate over the polymorphonuclear cells. I am willing to agree that many of them may come from the prostate; but I am sure that the large clumps of epithelial cells are expressed from the vesicles. My reasons are as follows: (i) They can invariably be found when palpable physical signs of vesiculitis are present. They may here come to light only after the second or third massage, owing to duct stenosis; if they were of prostatic origin one would expect them in the first film examined. (ii) They cannot be found in the urine before massage, and they are not found in smears of the prostatic part of the urethra taken through the urethroscope. Large squamous cells are the rule then. (iii) The clumps tend to be broken up after the vesicles have been flushed out with sufficient fluid (though not invariably), as in the operation of vasostomy, and usually they gradually disappear. (iv) The tendency of the cells to arrange themselves concentrically round a nucleus of fibrillated vesicular secretion is characteristic. (v) Many of the clumps are too large to come from prostatic tubules. (vi) Finally, and conclusively, I have been able on more than one occasion to aspirate small clumps of these degenerated cells from the vas during the procedure of vasostomy.

Without the foregoing evidence, such swollen, degenerated, anuclear cells would not be recognizable as the normal cuboidal vesicular epithelium. Dried, stained smears are unsuitable for such examination, since the clumps are dispersed and the cells stain poorly, so that they are often ignored. The wet film, being unstained, naturally does not help much with the bacteriological picture, but frequently motile bacilli can be detected, and indeed examination of a wet film is the only certain way of detecting the *Trichomonas vaginalis*. This organism is much the same size as the average vesicular cell, with granules rather smaller than those of the latter; but it is recognized by its pyriform tendency, its motility, its waving flagellae and its undulatory membrane. These would be lost in the ordinary methods of staining.

The microscopic examination of the wet film is preferably the clinician's job. It should not be left to the pathologist, for the following reasons. (i) It should be made every time the opportunity arises, such as after prostatic and vesicular massage, so that results can be recorded and progress watched from day to day. Since prostatic and vesicular massage is performed by me three times a week in all chronic cases, delay in awaiting a pathologist's report would be confusing. The examination can be made, if the microscope constantly stands at the clinician's right hand, almost as quickly as it takes the orderly to place the wet film on the microscope stage. (ii) The observations are quite personal and arbitrary, so that the observer alone can interpret them to his own valuation, which is seldom mathematically exact. For instance, it does not matter if one observer favours a higher magnification than another, so long as he accustoms himself to the same one; nor if he counts or groups his average fields differently from another, so long as he is consistent in his interpretations. This will be understood by reference to my own method of recording my observations. (iii) The wet film soon dries and deposits crystals, or on the other hand viscid vesicular secretion liquefies, so that it is advisable to examine it within half an hour.

My own results are recorded as follows: (i) "Nil", when no cells are found in the normal granular field (spermatozoa are disregarded). (ii) "Occasional", when

an occasional field contains one or two cells. (iii) "Very occasional." (iv) "2-5 per field", a rough average of a number of fields being taken. (v) "Few", when in most fields none are seen, but in an occasional field anything up to ten are found. (When the foregoing findings are repeated, I regard them as normal.) (vi) "5-10." (vii) "10-20." (viii) "20-30." (ix) "Numerous"; after 30 the cells become difficult to count. (x) "Clumps", usually found among other cells, but frequently comparatively free, so that a cursory examination may miss a clump. (xi) "Small clumps", which, as the name indicates, means smaller clumps, up to 20 to 30 cells, suggesting a breaking-up of the larger clumps, and for that reason more favourable. Large clumps usually overlap a field, but one or more small clumps may be contained within a field; they are looser collections, and often without nuclear centres (see Figure II). (xii) "Packed", when most fields are full to overflowing. Such packed films can often be seen to comprise a number of clumps compressed together (see Figure IIIb). My assistants have added to this list "occasional clump" or "occasional small clump", which provides them with some encouraging information as to progress. They have also considered it necessary to add further information, such as "occasional small clump, mainly E.C.", "E.C." meaning "epithelial cells". Certainly a gradual disappearance of the polymorphonuclear cell, with a corresponding relative increase in the number of epithelial cells, is an encouraging feature.

Admittedly the term "polymorphonuclear" is used rather loosely. Many of these cells which on account of their size are called polymorphonuclear may be epithelial cells smaller in size than the swollen degenerated ones towards the centre of the clump, and indeed when stained they may often turn out to be mononuclear.

Treatment of Vesiculitis.

In the acute stage of vesiculitis, treatment by rest, sitz baths and the administration of alkalis and sulphapyridine will no doubt suffice; any local interference such as massage is likely to do harm. When the pain, elevated temperature and dysuria have settled down and the urine is clear (except for some quickly settling debris), massage is commenced and wet films are examined. The routine treatment which then follows also holds for those cases in which the lesion is quiescent from the beginning. After another five to seven days, if no reaction has occurred, a curved steel sound is passed. The absence of further reaction encourages one to continue the massage three times a week and the passage of sounds twice a week, and the instillation of increasing strengths of silver nitrate or zinc chloride solution into the posterior part of the urethra, commencing with 1% and increasing up to 5%. The object of this local treatment is to decongest the mucosa of the posterior part of the urethra, to produce adequate drainage of the submucous glands and prostatic tubules (neither of which may be adequately massaged *per rectum*), and most important, to facilitate drainage from the ejaculatory ducts.

The foregoing routine treatment is that employed for all persistent infections other than tuberculosis of the posterior part of the urethra after subsidence of all signs of acute inflammation, whether the gonococcus persists in the secretions or not.

The reappearance of a urethral discharge during this treatment is not necessarily a reaction. It is to be looked for, and even hoped for, as evidence of the releasing of blocked ducts. At the same time, one should be suspicious of a local flare-up of a latent focus through such provocation, and go quietly till the discharge settles down again.

Protein shock therapy, especially if combined with one of the sulphonamide drugs, will frequently cause a happy improvement in the subacute or chronic resistant cases. Vaccines given intravenously, especially when a formidable temperature is desired as in gonococcal infections, or sterile milk given intramuscularly, have been mostly employed here. Gonococcal vaccines given subcutaneously are being used less and less, even in cases of arthritis; the good effects, when these occur, are probably due to a

non-specific reaction that can be better obtained in other ways.

When it is obvious that the vesicles cannot be cleared up except by months of treatment in this way, vasostomy is considered. Obviously it is useless to resort to vasostomy till drainage is fairly adequate, and whilst infection remains in other parts of the genital tract; hence the necessity for the preliminary treatment outlined earlier.

Vasostomy.

Vasostomy, a little operation of Belfield's, I have found one of the most exasperating in surgery, and I did not adopt it with enthusiasm till recently, because of its unpredictable drain on one's energy, temper and time. With experience, however, most difficulties can be overcome, so that now I do not hesitate to advise my patients to submit to the procedure.

Local anaesthesia is always employed by me, since patients can cooperate by describing their sensations. This is particularly useful when one is commencing the injection of the vas; the passage of cold fluid into the posterior part of the urethra immediately gives them the sensation of passing urine. Another reason is that I wish the procedure to appear as little like an operation as possible, and when proposing it I talk of injecting and flushing the glands, but never of operating. The patient after it is over walks back grinning into the ward, so that the next victim's apprehensions are not increased. Many patients approach me with the proposal that they should be "nicked" in order to "short-cut" their treatment.

The main efficacy of the procedure, though not the only one, is probably due to the large volume of fluid under pressure, which produces a mechanical flushing of the organ and dilates any loculations. Naturally it is imperative that a good safety exit should be provided, in the nature of patent ejaculatory ducts, when one is injecting fluid under pressure—an excellent reason for the preliminary treatment. Cold normal saline solution is therefore first injected in an amount of 30 to 40 cubic centimetres; this is followed by an antiseptic agent as non-irritating as one can find—mercurochrome (2% solution), or what may be better still, "Metaphen" (1 in 500 to 1 in 1,000) or Parke, Davis's "Phemerol" (1 in 1,000 aqueous solution). Mercurochrome has the advantage that the stain can be seen in the secretions sometimes weeks after the injection; possibly this is only suggestion therapy on the surgeon himself.

Sterilization of the vesicles is not invariably effected by such antiseptics. In a number of gonococcal infections gonococci will continue to appear in the stained prostatic or vesicular secretion, emanating from either prostate or vesicles; but in the majority of cases sterilization by post-operative treatment is facilitated through the more effective drainage.

Slight irritation due to the chemical will cause the appearance of numerous polymorphonuclear cells in the wet film for a short time, and sometimes red blood cells in moderate numbers are found for a few weeks, but they soon pass away. Less chemical irritation has so far been in evidence after "Metaphen" (1 in 1,000) and "Phemerol" (1 in 1,000), an occasional first post-operative examination of a wet film having received the report "nil", in contradistinction to the repeated clumps found before injection. Case V is an example of this early favourable finding. It must, however, by no means always be expected.

"Solutseptasine" has been tried in several cases, but seemed to have no more effect than the preliminary flushing with saline solution. Saline solution alone has been found useful in promoting free drainage of an organ in which fibrosis or possible adhesions have assisted loculation; but probably it does not otherwise assist sterilization.

"Prontosil rubrum" was used in several cases with promising results, but the quantity available was not sufficient to allow the formation of anything like a definite opinion.

Colloidal silver was abandoned years ago. The leakage of a few drops into the tissues of the scrotum produces a severe reaction, whilst an injection into the tissues of the

cord, if the duct is missed, causes a long period of painful incapacity. In addition, I believe the polymorphous cellular response in the vesicles is excessive, and theoretically, it appears undesirable to leave behind granules of an insoluble metallic substance to act as foreign bodies in any glandular tissue.

General anaesthesia may be found advisable by the beginner, since complete relaxation of the cremaster is necessary—an effect that I usually produce by premedication with "Nembutal" (three grains). Even in private practice I have used only local anaesthesia, and that in my professional rooms; my patients then go home, and some of the more hardy go to work next day. I find that a nurse familiar with my technique is more valuable than all the amenities of a modern operating theatre. The vesicles are not massaged for five days after operation.

Complications have been practically nil. In my experience of many years, on several occasions one vas has been divided by a cutting-edged needle; this cut has been sutured as well as possible by an eyeless needle.

Epididymitis occasionally follows (three times in over fifty operations); but it is very mild, and I believe it is chemical rather than infective in origin.

Cellulitis, non-suppurative but very painful, will occur if the injection misses the lumen of the duct. I have had no trouble with this since abandoning the use of "Neosilvol".

Does sterility ever follow? A little thickening is always left for some time at the site of the stripping of the vas, and any resulting fibrosis is likely to be increased by the leakage of chemical. In no case of mine that I have been able to investigate afterwards has a blockage of both ducts occurred; I have had the opportunity frequently of examining condom specimens from patients who have been so treated by me, and in each case I have found a normal number of spermatozoa. I invite every patient who has submitted to the procedure to present me at his leisure with such a specimen, though not all do so.

I am never anxious to repeat the procedure of vasostomy on the same patient, and have done so only occasionally. One such case is included in my list of non-specific urethritis cases; the patient had an infection with the *Trichomonas vaginalis*, which had responded well to the first injection of "Phemerol", but the finding of a few organisms later induced me to repeat the injection, such was my respect for the infiltration tactics of this pest in other theatres of war. I certainly am averse to the procedure of leaving a silkworm gut strand inside the lumen of the vas and of giving repeated injections; one would surely be inviting stenosis then.

Catheterization of the Ejaculatory Ducts.

As an alternative procedure to vasostomy, catheterization of the ejaculatory ducts does not fulfil requirements. In the first place, the percentage of successful manipulations has been low in my hands. Although methods have been employed to blanch the mucosa of the posterior portion of the urethra, blood tends to obscure one's view; moreover, even with a clear view the ejaculatory ducts are not always visible. When visible, they are not always accessible; and when they are accessible, their direction does not always permit the passage of catheters. Apart from these personal difficulties, which I admit may be only an expression of my own incompetence, the main objection is the small amount of fluid that can be injected under pressure. One of the advantages of vasostomy is that the opportunity is given for flushing and mechanical cleansing under pressure, the safety valve against over-distension of vesicle and epididymis being the patent ejaculatory duct.

Reports of Cases.

The following list of 77 cases comprises those in which operation was performed in a military hospital between January, 1941, and December, 1942. Early in the series, owing to accommodation and staff deficiencies, some patients were lost sight of before satisfactory post-operative findings were obtained, so that conclusions can be drawn from only 57 cases. Of the 77, in 41 the diagnosis was

urethritis, non-specific, and in 36 it was gonorrhœa. Of the 57, in 33 the diagnosis was urethritis, and in 24 it was gonorrhœa.

"Pre-operative days" will be understood to refer to the time during which the patients were under treatment in a military hospital before operation, and "post-operative

days", the time it took for all smears to become gonococcus-free, and for the wet films of the prostatic-vesicular secretion to become satisfactory in appearance. The "satisfactory" wet film was the first of a series of such films, it being recognized that one "satisfactory" finding was fallacious.

TABLE I.¹

Date.	Treatment.		Progress.	Complications and Their Treatment.
	Local.	General.		
14/8/42		Sulphapyridine commenced.		
18/8/42	P.P. ¹ commenced.			Discharge still present and urine cloudy.
21/8/42	M. ¹	Sulphapyridine finished.	W.F. ¹ "numerous".	Urine clear.
25/8/42	M.		W.F. "numerous".	Discharge very slight.
27/8/42	M. and S. ¹		W.F. "packed".	
28/8/42		Sulphanilamide commenced.		
29/8/42	M.		W.F. "numerous".	
31/8/42	M. and S., Zn ¹ (1%).		W.F. "numerous".	P.M.S. ¹ numerous p.c. ¹ ; gonococci present.
2/9/42	M.		W.F. "clumps".	
4/9/42	M. and S., Zn (2%).		W.F. "clumps".	
7/9/42	M. and S., Zn (3%).		W.F. "clumps".	Urine, occasional p.c., no organisms.
9/9/42	M.		W.F. "small clumps".	P.M.S., gonococci present.
11/9/42	M. and S., Zn (4%).		No W.F.	
13/9/42	Vasostomy. "Phemerol" (1-1,000)			
14/9/42	Transferred to another hospital owing to movement orders.			

¹ The urine of this patient continued to contain gonococci for several weeks after operation, but he was pronounced cured by me fifty days after operation.

¹ "P.P." = potassium permanganate solution irrigations (Janet's method); "M." = prostatic-vesicular massage; "W.F." = wet film of prostatic-vesicular secretion; "S." = the passage of a curved sound; "Zn" = instillation of zinc chloride solution into posterior portion of urethra, through Uthmann's cannula; "P.M.S." = stained smear of prostatic-vesicular secretion; "p.c." = pus cells.

TABLE II.

Date.	Treatment.		Progress.	Complications and Their Treatment.
	Local.	General.		
24/4/42		Sulphapyridine commenced.		
27/4/42	M. ¹		W.F. ¹ "numerous".	Urethral smear, few p.c., ¹ no gonococci.
29/4/42	M.		W.F. "small clumps".	
1/5/42	M.	Sulphapyridine finished.	W.F. "clumps".	No discharge.
4/5/42	M. and S. ¹		W.F. "numerous".	
6/5/42	M. and S./S., ¹ P.P. ¹ commenced.		W.F. "clumps".	Slight discharge, no gonococci.
9/5/42		Sulphathiazole commenced.		
11/5/42	M. and S.	Gonococcal vaccine, 50 million.	W.F. "clumps".	
13/5/42	M.		W.F. "few".	
15/5/42	M. and S., Zn. ¹ (1%).	Sulphathiazole finished.	W.F. "packed".	Still slight discharge, P.M.S., ¹ p.c., no gonococci.
18/5/42	M. and S., Zn. (2%).	Gonococcal vaccine, 250 million.	W.F. "clumps".	
20/5/42	M.		W.F. "clumps".	P.M.S., moderate p.c., no gonococci. Cultural examination, no organisms.
22/5/42	M. and S., Zn. (3%).	Gonococcal vaccine, 500 million.	W.F. "clumps".	
25/5/42	Vasostomy. "Phemerol" (1 in 1,000).			
29/5/42	M.		W.F. "few".	
1/6/42	M.	Gonococcal vaccine, 1,000 million.	W.F. "few".	
22/6/42	M. Out-patient.		W.F. "2-5".	No clinical signs.

¹ "P.P." = potassium permanganate solution irrigations (Janet's method); "M." = prostatic-vesicular massage; "W.F." = wet film of prostatic-vesicular secretion; "S." = the passage of a curved sound; "Zn." = instillation of zinc chloride solution into posterior portion of urethra, through Uthmann's cannula; "P.M.S." = stained smear of prostatic-vesicular secretion; "p.c." = pus cells; "S./S." = straight sound passed.

In the cases of urethritis, the average pre-operative time in hospital was fifty days, post-operative period, twenty days. In the cases of gonorrhoea, the average pre-operative time in hospital was sixty-one days, and the post-operative period, twenty-one days. In several cases of urethritis good results were recorded. In Case IV, the pre-operative time was forty-five days, and the post-operative time, seven days. In another case the patient had been under treatment in the Middle East and in this hospital for a total pre-operative period conservatively estimated at 200 days; his post-operative period was twenty-two days. A patient with an old infection was treated in various military units continuously for 131 days pre-operatively, but had actually been treated for years elsewhere; his post-operative period was estimated at fifty-one days. The wet films in this last case were repeatedly satisfactory in appearance, but the urine remained cloudy with pus, and cystoscopy revealed a ball-valve stone at the left ureteral orifice. I suspect that this was a phosphatic stone, the result of an ascending infection, but I was unable to determine that in this hospital.

Among the good results in gonococcal cases was one recorded in Case II, in which the patient had forty-nine pre-operative and four post-operative days to his credit. In an obstinate case the patient had a pre-operative period of 188 days and a post-operative period of eighteen days.

In many cases the results were poor—that is, the post-operative periods were unduly long. In most of these

"Soluseptasine" was used for injection, and the figures are included to swell the average.

One patient who had a vesicular infection with *Trichomonas vaginalis* was treated by vasostomy. He is not included in the 33 cases of urethritis, because he was the only one of the series that had a second operation, the first having failed to eradicate the secretion of the organisms completely; the second operation seemed to complete the cure.

Four examples are given here, Cases II, III and IV having been selected to illustrate good results; Case I was chosen at random, the result being anything but an immediately satisfactory one. Comparatively irrelevant details have been omitted from the reports.

CASE I.—The patient was admitted to hospital on August 14, 1942, with slight urethral discharge. He had had "gonorrhoea" in 1933 and been treated at a naval depot. He had had slight morning gleet ever since. He had suffered from double epididymitis with the original attack.

On examination, fairly profuse muco-pus was expressed; in a stained smear polymorphonuclear cells and numerous gonococci were seen. In the epididymes, thickening of both *globi minores* was present. Rectal examination disclosed thickening in the neighbourhood of the left vesicle. The two-glass test was applied, and both specimens were cloudy.

Table I shows the details of treatment.

TABLE III.

Date.	Treatment.		Progress.	Complications and Their Treatment; Other Observations.
	Local.	General.		
2/6/42 ..		Sulphanilamide commenced.		
5/6/42 ..	M. ¹		W.F. "small clumps".	P.M.S., ¹ few p.c. ¹ and Gram-positive cocci.
8/6/42 ..	M.		W.F. "clumps".	
10/6/42 ..	M. and S. ¹		W.F. "nil".	On account of one fallacious reading, regarded as anterior urethritis and treated accordingly.
12/6/42 ..	S./S., ¹ Zn ¹ (1%) anteriorly.			
15/6/42 ..	D, ¹ Zn (2%) anteriorly.			
17/6/42 ..	M.		W.F. "clumps".	Anterior urethroscopy, no abnormality detected.
22/6/42 ..	M. and S.		W.F. "few".	With the general improvement in wet films, it was decided to give nature a chance.
26/6/42 ..	M. and S.		W.F. "occasional".	
29/6/42 ..	M. and S.		W.F. "small clumps".	
1/7/42 ..	M.		W.F. "nil".	Discharged.
19/8/42 ..				Readmitted. Pains in loins, groin and rectum, especially left side, great frequency of micturition, pyrexia of four days' duration to 102° F., now falling by lysis under influence of sulphapyridine. Mucos at external meatus, microscopically, a few p.c. and epithelial cells. Urine, both glasses cloudy, centrifuged deposit, 40 p.c. per high power field, no organisms in direct smears. Rectal examination, tense, swollen, tender left vesicle.
25/8/42 ..	Rest, sits baths, alkalis and sulphapyridine. M. (light).		Temperature reduced and rectal pain eased. W.F. "packed".	P.M.S., numerous p.c., Gram-positive cocci, no gonococci.
26/8/42 ..		Sulphanilamide commenced.		
27/8/42 ..			W.F. "packed".	P.M.S. as before.
29/8/42 ..	M. and S.		W.F. "2-5" (no doubt atypical).	
31/8/42 ..	M.		W.F. "numerous".	
12/9/42 ..	Vasostomy. Mercurochrome, 2%.			
14/9/42 ..	Transferred to another hospital,	and discharged in two weeks.		

¹ "P.P." = potassium permanganate solution irrigations (Janet's method); "M." = prostatic-vesicular massage; "W.F." = wet film of prostatic-vesicular secretion; "S." = the passage of a curved sound; "Zn." = instillation of zinc chloride solution into posterior portion of urethra, through Ultmann's cannula; "P.M.S." = stained smear of prostatic-vesicular secretion; "p.c." = pus cells; "S./S." = straight sound passed; "D." = straight Kollmann's dilator.

TABLE IV.

Date.	Treatment.		Progress.	Complications and Their Treatment ; Other Observations.
	Local.	General.		
7/7/42		Sulphapyridine commenced.		
13/7/42	P.P. ¹ commenced.			Urine still cloudy with debris. Urethral smear, no gonococci. No organisms on cultural examination.
15/7/42	M. ²	Sulphapyridine finished.	W.F. ³ "20-30".	Urine hazy.
17/7/42	M.		W.F. "small clumps".	Urine clear, with debris. No discharge.
20/7/42	M.		W.F. "numerous".	
21/7/42				Epididymitis slight.
22/7/42		Sulphanilamide commenced.		
27/7/42	M.		W.F. "clumps" and red blood corpuscles.	Urine cloudy. Epididymitis resolved.
29/7/42		Sulphanilamide finished.		Urine cloudy. Slight recurrence of epididymitis. Urine clear with debris.
3/8/42	M.			Culture of prostatico-vesicular secretion, no gonococci.
5/8/42	M. and S. ⁴	Sulphanilamide recommenced.	W.F. "5-10".	
7/8/42	M.		W.F. "few".	Urine clear.
10/8/42	M. and S.		W.F. "clumps".	
12/8/42	M.	Sulphanilamide finished.	W.F. "numerous", with red blood corpuscles.	
14/8/42	M.		W.F. "numerous".	
17/8/42	M. and S., Zn. ⁵ (1%).		W.F. "clumps".	P.M.S. ⁶ many p.c., ⁷ no organisms.
19/8/42	M.	Sulphanilamide recommenced.	W.F. "clumps".	
20/8/42	Vasostomy (chemical not stated).			
25/8/42	M.		W.F. "one clump", most fields clear.	
27/8/42	M.		W.F. "few".	
29/8/42	M. Out-patient.		W.F. "nil".	
1/9/42				Readmitted with thick purulent discharge, confessed to intercourse without prophylaxis on the night of leaving hospital. Urethral smear contained many gonococci.
7/9/42	M.		W.F. "nil".	

¹ "P.P." = potassium permanganate solution irrigations (Janet's method); "M." = prostatico-vesicular massage; "W.F." = wet film of prostatico-vesicular secretion; "S." = the passage of a curved sound; "Zn." = instillation of zinc chloride solution into posterior portion of urethra, through Uitzmann's cannula; "P.M.S." = stained smear of prostatico-vesicular secretion; "p.c." = pus cells.

CASE II.—The patient was admitted to hospital on April 24, 1942. He had had a slight discharge almost continuously for years. His condition had never been acute, and treatment had been casual.

On examination a slight amount of muco-pus was found at the meatus. In a urethral smear many polymorphonuclear cells and some gonococci were seen. The urine was clear and contained a slight amount of debris.

Table II shows the treatment in Case II.

CASE III.—The patient was admitted to hospital on June 2, 1942, complaining of slight moisture at the external meatus, and also of "sore and painful" testes for twelve to eighteen months. He gave no history of acute urethritis.

On examination, there was no sign of any discharge, and no smear was obtainable. There was no sign of any past or present epididymitis. Rectal examination disclosed no abnormality. The two-glass test was applied to the urine. In both glasses it was clear, and contained one or two short threads.

The treatment given in Case III is set out in Table III.

CASE IV.—The patient was admitted to hospital on July 6, 1942, with a thick urethral discharge of three

days' duration. In a stained film were seen numerous polymorphonuclear cells and large Gram-positive cocci and diplococci, but no gonococci. In the two-glass test, the urine in both glasses was cloudy.

The treatment in Case IV is set out in detail in Table IV.

Summary.

1. The aetiology, bacteriology, diagnosis and treatment of acute and chronic vesiculitis have been discussed.
2. The frequent examination of wet films of the prostatico-vesicular secretion is recommended in every case of posterior urethritis, in order to watch progress.
3. Attention is drawn to the existence of a mild, chronic vesiculitis of non-specific aetiology, which is recognizable only by repeated wet film examination.
4. The prostatico-vesicular secretion is described, it is believed, more fully and accurately than heretofore.
5. The operation of vasostomy here finds some justification in the hands of the genito-urinary expert. My experience with this operation is briefly given, and the indications for such treatment are explained by reference to several case records.

Reviews.

KERATOCONJUNCTIVITIS SICCA.

TEN years ago Sjögren, of Sweden, summarized his own findings and the reports of others concerning filamentary keratitis in a small volume entitled "*Zur Kenntnis der Kerato-conjunctivitis sicca*". A translation of this volume has been published by Dr. J. Bruce Hamilton.¹ In an appendix, Dr. Hamilton has summarized the few reports since 1933 and given his own experience and opinions. Interest in this condition has been created chiefly by the papers of Stock, Mulock Houwer, Bruce and the author of this monograph. To Leber's original description of filamentary keratitis associated symptoms were gradually added until a syndrome was defined. The description of associated conditions as a syndrome has advantages, but it also has dangers; they will, however, be obviated if the description is accurate and accepted as a challenge.

This work gives an excellent description of the clinical findings—the appearance of the cornea and conjunctiva, the staining with Bengal rose, the estimation of the lacrimal secretion—and of the histology of the affected ocular tissues. The photomicrographs are good and very well reproduced. Slit-lamp views could have been added with advantage for those not familiar with the condition. Among the features of this disease that the author has studied with thoroughness is the apparent moistness of the eye in the partial or complete absence of the lacrimal secretion. He attributes this fact to a supplementary supply of fluid by the conjunctiva. Oedema of this tissue occurs, which is sufficient to keep it and the conjunctiva moist until a hydropic degeneration follows that permits desiccation of the conjunctiva.

The more the deficiencies in a work of this kind, the greater will be its challenging nature. Little appears in this volume regarding the cause of this syndrome and its treatment as a whole. The unfortunate mystery obscuring its cause is not the only respect in which this syndrome resembles another—the idiopathic variety of von Mikulicz's syndrome. Both syndromes usually affect lacrimal and salivary glands, and the majority of patients are female and middle-aged. For neither syndrome is there any specific treatment. Amongst the problems raised by a perusal of this volume is the relationship of this syndrome with xerostomia—the insidious dry mouth that also almost solely attacks women in the fifth and sixth decades and may be associated with deficient lachrymation. *Keratitis sicca* may be related also to a form of atrophic rhinitis. The volume contains no reference to the ocular findings in von Mikulicz's syndrome—another field worthy of investigation. Arthritis is included in the syndrome of Sjögren, but no description is given of the particular forms and little of radiographic evidence. The blood changes observed by others were not referred to by Sjögren except in a more recent paper. No attempt has been made in this work to consider the cause of the various lesions. No reports are furnished of the results of antibacterial, deficiency or endocrine treatment. It is remarkable that no reports should be given of endocrine therapy when the sex-limited nature of the disease is so well recognized. Beetham's treatment is palliative, but often gives the patient considerable relief. It consists of occlusion of the canaliculi by a coagulating current. If this fails Gifford's method may succeed. Occlusion is usually supplemented by the instillation of artificial tears. The description added by Hamilton of their preparation will prove to be of great value. The ocular part of one type of the syndrome "responds most remarkably" to this therapy, but no reference is made to that of the concurrent symptoms—the dry mouth, arthritis, achylia and anemia. The composite nature of the syndrome is suggested by Hamilton's division of *keratitis sicca* into two forms. One he considers is primarily lacrimal and the other corneal in origin. The variation in the response to treatment suggests a fundamental difference. As time elapses it is likely that further devolution of the syndrome will occur.

The end results of the syndrome are not referred to; indeed in few of the cases reported by Sjögren were the

patients followed for more than eighteen months. The closing of canaliculi and the supply of artificial tears sometimes give relief to one of the symptoms, but what is the final destruction wrought by the untreated unrecognized underlying cause? As an accurate description of the clinical and histological appearance of the affected ocular tissues and as a stimulus for further investigation this book will be a valuable addition to the ophthalmologist's library.

PHYSIOLOGICAL PRINCIPLES IN TREATMENT.

TEXT-books in physiology can be divided into three classes: (a) the traditional work of a well-known academician designed to teach students who are commencing the study of the subject for the first time; (b) larger, more diffuse, detailed works, with full reference, intended for the advanced student or for the candidate for a post-graduate degree; (c) small, concise summaries, in which every effort has been made to incorporate important principles, new and old, in a thoroughly readable manner, and which are produced expressly for the busy practitioner, who probably is without further academic ambitions, but who desires a small "refresher" in more ways than one. A good example of this last-mentioned type of production is the well-known "Physiological Principles in Treatment" of Langdon-Brown and Hilton, now in its eighth edition and thirty-fifth year—figures which are eloquent of a continued demand.¹ The collaboration between such a famous professor and senior physician and an active member of the consultant ranks of London would obviously succeed to an unusual degree in a work of this character. The substance of the contents, nevertheless, still bears the imprint of the sound enunciations of the senior author, who has been responsible for the book's lasting popularity.

In their preface the authors state that "the enormous and growing amount of factual information in the text-books of both physiology and medicine increases, in our opinion, the need for a book of moderate size in which the emphasis is laid on principles rather than on details." It is indeed amazing that the book retains its handy dimensions and approximate equivalent of pages so uniformly from one edition to another. Sometimes one wishes for some further detail; but a moment's reflection on the purpose of the book suffices to dispel this transient annoyance. In our review of the seventh edition five years ago, we pointed out most of the instances in which our own clinical experience was at variance with that of the authors, and it is not proposed to repeat these remarks. After all, physiological principles are the kernel of the work. Such clinical facts and therapeutic suggestions as appear are added as collaries.

The section on pituitary hormones has been revised, and into some five pages are collected the main beacons in this stormy area of endocrinology. Old-fashioned notions as to the occult effects of subthyroidism still find a place under the section on the thyroid gland. The use of thyroloid extract in premature arterial degeneration also reflects some wishful thinking. No mention is made of liver damage following thyrotoxicosis, and the simple statement that thyrotoxicosis may be masked is unamplified. In the section on digestion, the golden rules for the treatment of hypochlorhydric dyspepsia are excellent. In the discussion on gastric ulcer, the histidine treatment is condemned for all time, and a detailed Meulengracht diet is included. In the chapter on glycosuria some practical directions (after Lawrence) are included for the administration of slowly acting insulin. The initial dosage of insulin advocated for frank diabetic coma (50 units) is now considered to be quite inadequate. No attempt has been made to alter the diet tables to conform with the fluctuating food restrictions necessitated by war. The interesting chapter "How Do Drugs Act?" has been completely rewritten to include a discussion of their effects on cholinergic and adrenergic nerve-endings, of vitamins, of sulphonamides, and of relationships between hormones and vitamins *et cetera*, and the reader regrets its brevity.

All that remains is to state that the eighth edition of this book is well up to the standard of its predecessors, that in general its advice is golden, and that every general practitioner, physician and post-graduate student can in no circumstances afford to omit "Physiological Principles" from his library list.

¹"A New Conception of Keratoconjunctivitis Sicca (Keratitis Filiformis in Hypofunction of the Lacrymal Glands)", by Henrik Sjögren, with a foreword and appendix by J. Bruce Hamilton; 1943. Sydney: Australasian Medical Publishing Company, Limited. 94" x 6", pp. 152, with illustrations. Price: 25s.

¹"Physiological Principles in Treatment", by Sir Walter Langdon-Brown, M.A., M.D., Hon.D.Sc., F.R.C.P., Hon.L.L.D., Hon.F.R.C.P.I., and Reginald Hilton, M.A., M.D., F.R.C.P.; Eighth Edition; 1943. London: Baillière, Tindall and Cox. 84" x 54", pp. 331. Price: 12s. 6d.

The Medical Journal of Australia

SATURDAY, FEBRUARY 26, 1944.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

THE PHARMACY BENEFITS SCHEME OF THE COMMONWEALTH GOVERNMENT.

A BILL to give effect to the Commonwealth Government's scheme for pharmaceutical benefits was introduced into the Senate on Wednesday, February 16, 1944, by Senator the Honourable J. M. Fraser, Minister for Health and Social Services. Readers of this journal were made conversant with the general outline and with the significance of this scheme by a discussion in these columns in the issue of January 22, 1944. It may be useful to recall the statement that the scheme was to be introduced "as part of the expanding programme of social legislation", and that according to its provisions "authorized medicines" were to be supplied without charge to patients, the service being available to all members of the community who wished to accept the benefit. A formulary was to be set up as a basis for prescribing, and the patient would be entitled to the benefits of the scheme only if the prescription ordered by a medical practitioner was included in the formulary. Elasticity of prescribing was to be maintained in two ways—either by a reduction of the dose of any of the component ingredients or by the omission of any ingredient. If a drug deemed necessary by the medical practitioner was added to the prescription set out in the formulary, or if the dose of one of the constituents of the prescription was increased, the patient would not be entitled to the benefits of the scheme and could be called upon by the pharmacist to pay for his medicine. As was explained in the issue of January 22, such a proposal could not possibly be acceptable to medical practitioners. The attitude of the profession was made clear by Sir Henry Newland at an informal conference that took place on December 8, 1943, between the Minister and representatives of the British Medical Association when he made the following statement:

We, the representatives of the medical profession, recognize fully that the restoration to health and the alleviation of suffering should be our paramount considerations.

Holding this opinion, we consider that it is essential that in the acceptance of responsibility for the treatment of the sick, the medical profession must be entirely untrammelled in regard to the therapeutic measures to be adopted.

For this reason we feel that the welfare of the sick would be seriously jeopardized by the adoption of any scheme which would limit the freedom of a doctor in prescribing for each of his patients exactly what medicine he regards as most suitable to restore him to health.

The question was discussed by the Federal Council of the British Medical Association in Australia at its meeting at Melbourne on January 31, 1944. The statement made by Sir Henry Newland at the informal conference was unanimously approved. The Federal Council also resolved that, provided the principle enunciated in Sir Henry Newland's statement was recognized by the Government in its scheme for pharmacy benefit, the Federal Council would undertake to recommend to the members of the British Medical Association in Australia the fullest cooperation in the use of an official formulary. For non-medical persons this may be explained as meaning that the Federal Council is not opposed to the use of a formulary as such, but to the provision which would restrict practitioners to the use of that formulary when they are prescribing for sick persons who wish to claim benefits under the new act. It is computed that possibly 75% or 80% of medical prescribing can be carried out on a well-chosen formulary and that in many other instances therapeutic needs will be met by the addition of one or more drugs to those contained in the formulary's prescriptions. After the recent meeting of the Federal Council the following letter was sent to the Minister under the date February 7, 1944.

[COPY.]

Senator the Hon. J. M. Fraser,
Minister for Health,
Department of Health,
Canberra, A.C.T.

PHARMACY BENEFITS SCHEME.

Dear Sir:

In further reference to conferences between your good self and representatives of the profession regarding the proposed scheme of the Commonwealth Government for pharmacy benefits, I have now to advise you that the Federal Council, at its meeting in Melbourne on the 31st January last, unanimously approved of the statement which was submitted to you at the conference in Canberra on the 8th December, 1943.

In the view of the Federal Council the acceptance of the principle enunciated in this statement, copy of which is attached, namely, that the medical profession must be entirely untrammelled in regard to the therapeutic measures to be adopted in the treatment of the sick, is an essential condition of an agreement to the use of any formulary in a pharmacy benefits scheme.

In effect, this means that the Federal Council will be willing to recommend to the members of the British Medical Association in Australia the fullest cooperation in the use of an official formulary provided that where a drug is ordered which is not within the formulary the patient shall be supplied with such drug without cost nevertheless. It is the view of the Council that any restriction on drugs supplied without cost to the patient will necessarily indirectly mean restrictions on prescribing by the medical practitioner. So far as the formulary is concerned the Council believes that by far the greater proportion of the prescriptions ordered will be from among those contained within the formulary.

With regard to the administration of a Pharmacy Benefits Scheme I am to advise you that the Council regards it as essential, holding the view that such a scheme is part of a complete medical service, that the practising medical profession should be adequately represented on the controlling body, which should be of a statutory nature.

I am further to respectfully advise you that the Council is firmly of the opinion that the proposed Pharmacy Benefits Scheme will not materially improve the health of the community, and that it considers that the large expenditure involved in the project could be much better devoted to

other measures, such as hospital construction and equipment, care and treatment of sufferers from tuberculosis, maternal and child welfare, and diagnosis and treatment of cancer.

Faithfully yours,

(Sgd.) J. G. HUNTER,
General Secretary.

In the bill as submitted to Parliament no provision is made for variation by prescribing medical practitioners of prescriptions included in the formulary. Some of the relevant clauses of the bill are as follows:

Section VII: The pharmaceutical benefits referred to in this act shall consist of (a) un compounded medicines, the names of which, and medicinal compounds the formulæ of which, are contained in a prescribed formulary to be known as the Commonwealth Pharmaceutical Formulary; and (b) materials and appliances (not being un compounded medicines or medicinal compounds) the names of which are contained in a prescribed addendum to the Commonwealth Pharmaceutical Formulary.

Section IX: (1) Subject to subsection 4 of this section, a person shall not be entitled to receive any pharmaceutical benefit (a) except from an approved pharmaceutical chemist and (b) on presentation of a written and signed prescription or order (which shall be in accordance with the prescribed form and written on a form supplied by the Commonwealth) by a medical practitioner.

Section IV: The Director-General may in respect of any place where there is no approved pharmaceutical chemist approve of the supply of pharmaceutical benefits by any medical practitioner in accordance with such conditions as are prescribed.

Section XI: (1) A hospital authority may make application to the Director-General for approval to supply pharmaceutical benefits.

Section XVIII: For the purpose of this act there shall be a formulary committee consisting of six persons appointed by the Minister.

From the foregoing it is clear that the medical profession of the Commonwealth through its official organization has taken a logical attitude that is concerned solely with the provision of treatment suited to the needs of the patient. If the Government is prepared to meet the patient's needs the profession will cooperate with the Government. At the same time the profession makes important constructive suggestions pointing to a more excellent way. The position in regard to hospital accommodation throughout the Commonwealth is disquieting. Doctors in every part of every State complain of the difficulty which they experience in securing admission of their patients to hospital. It will also be within the knowledge of many lay members of the community that persons in need of hospital treatment have been unable to obtain it owing to a shortage of beds. Every now and again some unusually unfortunate instance of damaging delay suffered by a patient finds its way into the newspapers; but for every reported incident there are scores of others. In its recent report the Factual Subcommittee of the Parliamentary Joint Committee on Social Security draws attention to the serious shortage of hospital accommodation—6,690 beds in general hospitals, 2,963 in hospitals for tuberculous patients and 6,994 in hospitals for mental patients. In addition to this many of the existing buildings are antiquated and the equipment is far from up to date. In regard to tuberculous patients the position is particularly bad. For many years recommendations have been made to the various governments in the Commonwealth regarding the care of the tuberculous, but very little has ever been done. There is no doubt whatever that to spend on the tuberculous alone the sum of money which the Commonwealth Government proposes to spend on its pharmaceutical benefit, would return health dividends

many times greater than those that can be expected from a placebo of "free medicine". These and other sociological and health problems are crying out for attention; if they were put in the forefront of the Government's "expanding programme of social legislation", Australians of generations to come would mark the present epoch as the turning point towards social health and unity. Until these problems are so placed and solved the nation will mark time if it does not regress.

Current Comment.

THE HYPERKINETIC DISEASES.

It has generally been held that in organic disease morbid tissue changes precede disturbances of function. This is a rule that should not be too rigidly maintained; for it is reasonable to believe that in some cases functional disorders, which are often nothing more than exaggeration of normal function, should at last of themselves cause physical damage, hence organic disease. Eli Moschowitz is one who subscribes to such a view.¹ To the group of diseases having their origin in disordered function he applies the term "hyperkinetic diseases". These maladies "arise largely conditioned by psychosomatic factors, the result of the impact of environmental influence upon a constitutional background". He classes the following among his hyperkinetic diseases: hypertension, which results from an exaggeration of the normal intra-arterial pressure; thyrotoxicosis, "which represents, in greater part at least, an exaggeration of the normal basal metabolic rate"; peptic ulcer, "in which one of the dominant expressions is the exaggerated acidity and secretion of the normal stomach"; cardiospasm, which represents an increase in the tone of the cardiac sphincter; spastic colon and mucous colitis, which result from exaggeration of peristalsis, tone and secretion of the colon; manic-depressive psychosis, "which represents an exaggeration of a normal rhythm"; paranoia, "which represents an exaggeration of the affective functions".

Moschowitz sets out the causes of hypertension in their order of frequency, as follows: psychological influences, persistent Graves's disease, renal damage, adrenal blastoma or paraganglioma, "congenital peripheral resistances" (for example: stenosis of the aortic isthmus), increased intracranial pressure, influences from the carotid sinus, lead poisoning, Cushing's syndrome, and obesity. In all but the first two of these, morbid changes precede exaggeration of function. But in hypertension of psychological origin and hypertension of persistent Graves's disease, the increased intra-arterial pressure is "the primary process in the sense that it is the earliest clinical manifestation, so-called 'essential' hypertension". Subjects of hypertension "tend to be soft muscled, unathletic in type and bodily movement, pudgy, short-necked, ungraceful and overweight". Psychically, their constitution is the antithesis of a child's; they do not play; they are irritable, and they have "single-track minds without avocations". Their mental horizon is narrow; but "within this range they are tense and pursue their aims with a grim desperation". Moschowitz believes that the increase in essential hypertension in recent years may be explained in part as a by-product of modern civilization, of the stresses and strains that living under modern conditions entails. Striking testimony to this view is the recent increase of hypertensive disease among Negroes in the United States of America. Negroes are not affected in their native Africa. Diet can scarcely be regarded as a factor in this instance; for the diet of the North American Negro has not changed. "In other words, essential hypertension of the greater circulation, like infection and other disease conditions, is the resultant of a background and an insult". Neither factor alone is sufficient.

¹ The American Journal of the Medical Sciences, November, 1943.

The morbid anatomical consequences of persistent hypertension are "arteriosclerosis and eventually the catastrophic evidences of the cardiovascular-renal syndrome". It has been questioned whether increased tension alone can cause arteriosclerosis, because of the occurrence of arteriosclerosis in the aged in the absence of any increase in intraarterial tension. But Moschowitz points out that hypertension is a relative value only, and represents nothing more than an exaggeration of the normal tension. Furthermore, gross arteriosclerotic changes occur in the pulmonary artery almost exclusively in those diseases of which an essential feature is increased tension in the pulmonary circulation. It is unlikely that the pressure in the pulmonary arteries ever approaches even the normal pressure in the systemic circulation. If then pressure in the pulmonary arteries can cause anatomical changes in the arterial walls, it is reasonable to suppose that "the normal systemic pressure, given sufficient time, can produce the decrescent or senile type of arteriosclerosis of the greater circulation".

Moschowitz prefers the term "Graves's syndrome" to "hyperthyroidism"; for the symptoms often persist after hyperthyroidism, as measured by the basal metabolic rate, has disappeared. The personality of the patient in this disease is characteristic, and in doubtful cases, elucidation of the personality serves as a diagnostic measure.

Their eyes stare and are bright and they show more of the whites, especially in action or under emotional stress. During emotion, also, the pulse rate rises to excessive heights and there is tremor. In women, the neck tends to be fuller than normal. . . . Their basal metabolic rate while within the normal range, usually, in my experience, veers to the plus side. Dermographia is nearly always present. These people are exceedingly touchy and respond to their environment like an *Æolian harp*. . . . As a consequence, they are usually intolerant. They are shy and introvert and live a life of escape. Their personalities have an unusual manic-depressive trend. . . . They are quick in their movements and mental process. They are prolific day dreamers and idealism plays a large rôle in their mental life. They show a leaning toward the mystic and reveal the artistic temperament, so that in this group one frequently finds poets, writers, painters. Charm is a salient characteristic. They are usually bad sleepers. They commonly relate that in their childhood a nervous disorder followed a slight emotional upset. . . . They tire easily mentally and physically. . . . They easily become drunkards or drug addicts; . . .

The family history in this disease is remarkable. Two or more members of a family are afflicted more frequently "than the normal law of averages allows". Most of the siblings are neurotic and many have manic-depressive trends. In most cases the fully developed disease is ushered in by some psychical trauma. A sudden increase in the incidence of Graves's disease occurred in Vienna after the theatre fire of 1884, and in San Francisco after the earthquake.

Moschowitz goes on to discuss peptic ulcer. The subjects of this disease tend to have a hard, tense expression; their eyes are deep and sullen; their facial lines are sharply drawn; their mouths are firm; their jaws are sharply angled, and their masseter muscles are prominent. The majority of patients are intolerant, "self-absorbed and mentally inelastic folk with strong aggressive, masochistic and sadistic tendencies"; they have a paranoid trend, and they are "haters and fighters". The onset of clinical symptoms is frequently preceded by a period of emotional conflict. Failure to respond to the usual treatment is commonly due to some existing mental upheaval. Emotion causes hyperchlorhydria. Hyperchlorhydria is an intermediary between the psychical influence and the ulcer.

Moschowitz has been impressed by the psychosomatic relationship in non-specific ulcerative colitis. He points out that the onset or exacerbation of symptoms frequently coincides with an emotional upheaval. He has found that psychotherapy occasionally induces dramatic remissions. He has usually found subjects of ulcerative colitis to be "soft and non-aggressive, fussy and overconscientious, sensitive and immature, weak-willed, narrow horizoned and . . . utterly dependent individuals". But the

"mechanism whereby psychogenic influences produce this serious disease is entirely speculative".

Lack of space forbids discussion of Moschowitz's views on other of the so-called hyperkinetic diseases. The paper is attractive and interesting and might be read with profit by all medical practitioners. We are not inclined to agree with his views in their entirety; but we believe that he has presented powerful (in some places convincing) arguments in support of his general thesis. The importance of psychogenic influences in the production of disease is becoming more and more widely appreciated. The evil effects of exaggerated function are not so generally recognized. Here is a field of research for the general practitioner, who has unique opportunities for studying disease in its larval stages.

NAIL PUNCTURE WOUNDS.

In September, 1942, a reference was made in these columns to a report issued from a United States naval air station by H. F. Bowen on nail puncture wounds of the foot. Bowen's report was of interest from several points of view. On the anatomical side he pointed out that the foot is a complex unit and that one layer of fascia tends to slide over another when the foot is used in walking. Consequently, when a patient walks from the place of injury to a place where the foot is dressed, the tract will be more like a staircase than a straight line. For this reason Bowen concluded that probing would be harmful and that it might open up to infection new planes of tissue. Bowen also reported experiments on the foot of a cadaver, which showed that a nail was wiped clean in the first quarter inch of the tract. Bowen used a simple method of treatment which comprised the painting of an area round the wound with tincture of mercuric iodine and the cutting away of the epidermis for several millimetres around the circumference of the wound. The wound was not probed beyond a quarter of an inch; a dressing was applied and 1,500 units of tetanus antitoxin were given.

Another article on nail puncture wounds has been published by J. F. McDonnell, D. A. Wallace and J. E. Andes, who wrote from the medical department of an ordnance works.¹ They have treated 721 men for nail puncture wounds; 424 of these were in the foot and 298 in the hand. At the place where the men were working an excessively large amount of rain fell and work was done literally in mud. In the treatment of these punctures the wound was scrubbed well with liniment of soft soap and water and wiped with sterile gauze. With pointed scissors and small thumb forceps the edges of the wound were trimmed away through the entire thickness of the skin, so that a round hole was left, the edges of which were not approximated. The wound was then probed gently with a rough probe; this served to remove small particles of foreign matter and to determine the direction of the wound. A blunt needle attached to a syringe was inserted, as indicated by the probe, and from one to two cubic centimetres of antiseptic solution were injected and allowed to return outside the needle, the wound being thus irrigated from its deepest point. Hydrogen peroxide solution, tincture of "Merthiolate" and tincture of "Metaphen" were used for this purpose. Tetanus antitoxin was given only if the wound showed evidence of gross contamination or if it was unusually deep—over half an inch. No tetanus occurred in the series. Local infection developed in 43 of the 721 cases. Eleven of the 43 patients had not reported until an average of 2.5 days had elapsed from the time of the injury. In six of the 43 cases the infection was sufficiently severe to cause loss of time from work. The average disability was 0.072 day per injury.

This report shows that the main essential is the establishment of drainage. On anatomical grounds Bowen's refusal to use the probe is commendable. Punctured wounds are better unexplored if drainage is established. Regarding the use of antitetanic serum, it is better to play for safety and use serum; death from tetanus after a small punctured wound would be a disaster of the worst order.

¹ *The Journal of the American Medical Association*, December 4, 1943.

Abstracts from Medical Literature.

RADIOLOGY.

Bleeding in Hiatus Hernia.

OTTO D. SAHLER AND AUBREY O. HAMPTON (*American Journal of Roentgenology*, April, 1943) state that the incidence of hiatus hernia is considerably higher than has been appreciated, and hæmorrhage is a frequent symptom of the condition. Bleeding caused by hiatus hernia is probably due to constriction of the hernial ring, with resultant gastritis and ulceration of the herniated fundus. If neither gastritis nor ulceration is present, the lesion will not cause bleeding.

The Infected Lung Cyst.

LEO G. RIGLER (*American Journal of Roentgenology*, May, 1943) states that the true lung cyst, developing as it does from a bronchial bud, is commonly lined with bronchial epithelium. This is a secreting mucous membrane and the cyst will therefore be filled with fluid. If a communication with the bronchus exists, both gas and fluid will be found in the pocket. In some instances the communication with the bronchus is of such a nature as to cause a complete filling of the pocket with air. Apparently the secreting membrane is insufficient to produce much fluid, so that gas alone may be present. In most true cysts fluid is also found. The bronchial communication may open or close, so that at different times the cyst may contain fluid alone or both fluid and gas. A pocket lined with a membrane secreting mucin may be entirely harmless until the entrance of infection from the general respiratory tract through a bronchial fistula. A relatively harmless cavity is, thereby, converted into a suppurative pocket which may give all the symptoms and signs of a chronic lung abscess or an encysted empyema. A lung cyst when infected, even if adequately drained, often does not clear up permanently, as does an empyema. Because of the lining with bronchial mucosa, secretion tends to continue in a lung cyst. Through the bronchial communication a source of infection is present which will cause repeated attacks and produce a pocket of suppuration more or less permanently within the chest. Such lung cysts may not be amenable to the ordinary procedures, and it seems possible that some of the cases thought to represent recurrent chronic encapsulated empyema, which are resistant to drainage, may well be infected lung cysts rather than empyemata.

Correlation of Disability with X-Ray and Clinical Findings in Silicosis.

J. W. G. HANNON (*Radiology*, July, 1943) states that the degree of dysfunction of the lungs in pulmonary fibrosis is not proportional to the amount of anatomic change revealed by the X-ray film. Inhalation of toxic dusts, such as silicon dioxide, frequently decreases pulmonary function before the shadows of the silicotic nodule become visible on the skiagram.

Disability in silicotics varies greatly in degree, although the X-ray films in two or more cases may indicate that the abnormal changes are apparently equal. This is especially true in the moderate and far advanced cases. Disability in silicotics is not primarily due to nodular fibrosis, but is caused by the thickening of the alveolar walls and associated emphysematous changes with decreased elasticity of the lungs and interference with normal gaseous exchange. These changes are present before nodular fibrosis is visible on the X-ray film. Later oedema of the air sacs and terminal bronchioles and engorgement of the capillaries surrounding these structures are contributing factors in causing disability. Disability must therefore be estimated in terms of altered function of the lungs rather than by the degree of nodulation visible on the X-ray film.

X-Ray Examination of Pancreatic Tumours.

J. BORAK (*Radiology*, August, 1943) states that in no other condition are so many methods of X-ray examination required as in pancreatic tumours. It is safe to say that the failure to diagnose a pancreatic tumour radiologically is in most cases the result of failure to use all the methods available. With the use of all such methods, the radiological diagnosis of a pancreatic tumour should be possible with quite the same degree of certainty as that attainable in the diagnosis of an abdominal tumour of any other origin. Whether a pancreatic tumour is benign or malignant, it is radiologically recognizable only in so far as it is associated with an enlargement of the pancreas, and this means expansion of the pancreatic area. Owing to the fact that the tail of the pancreas is higher than its head, while the left side of the diaphragm is lower than the right, pathological processes occurring in the tail may give rise to changes in the left side of the diaphragm and lung which can be readily recognized by means of fluoroscopy. There may be elevation of the diaphragm, a diminution of excursion (particularly posteriorly) or complete arrest. At the base of the lung, parallel to the diaphragm, there may appear a band-like shadow indicating an area of atelectasis. Finally an effusion may develop, often hæmorrhagic in character. The findings are, of course in no way characteristic of pancreatic disease, and are encountered in various subdiaphragmatic conditions. When, however, they occur on the left side and there is no indication of a perinephritic process (such as fever), the pancreas should be suspected as a possible source of trouble. Since the pancreas lies directly in front of the spinal column, a pancreatic tumour can exert pressure on a vertebra or may invade it. Such involvement is usually attributed to a metastasis from a distant tumour or to primary disease of the vertebra. However, when the process is found on the anterior surface of one of the upper three lumbar vertebrae, when the left half of the vertebra is mainly affected (since the pancreas runs from the right anteriorly to the left posteriorly), and when there are signs of compression as well as of destruction, invasion from a neighbouring pancreatic lesion should be taken into consideration. It is

important to know that not only pancreatic stones or abscesses, but also tumours, may cast distinct shadows, recognizable on plain films taken in the same manner as for demonstration of the kidneys. Tumours arising in the head of the pancreas produce a characteristic horseshoe-like widening of the duodenal curve. The widening is the result of displacement of all three portions of the duodenum, which hug the head of the pancreas. In addition, the antrum of the stomach is likely to be displaced upward. Tumours originating in the body of the pancreas, which runs to the left with a slight upward inclination, behind the pyloric region displace the pre-antral part of the stomach upward. Tumours originating in the body of the pancreas produce a displacement of the stomach forward, thus carrying it nearer to the anterior abdominal wall and away from the vertebral column. This form of displacement is easily recognized by examination in the frontal plane, with the patient upright, supine, or lying on the right or left side. The increase in the distance between the vertebral column and the stomach is, besides the widening of the duodenal circle, the most characteristic and most frequently encountered sign of a pancreatic tumour. Examination of the stomach in the lateral view, therefore, should never be omitted, but should be done as a routine, in the course of the radiological examination of the gastro-intestinal tract. Pancreatic tumours of large size, bulging through the gastro-colic omentum, may cause a displacement of the colon. A distended gall-bladder is evidence of great importance in the diagnosis of tumour of the head of the pancreas.

The Diagnosis of Chronic Constrictive Pericarditis.

HAROLD J. STEWART, JOHN R. CARTY AND JOHN R. SEAL (*American Journal of Roentgenology*, March, 1943) state that when venous engorgement, serous effusions and hepatomegaly are present, indicating obstruction to the flow of blood through the heart, the composite radiological picture pointing most conclusively to chronic constrictive pericarditis as a cause of this obstruction is as follows: a small or only slightly enlarged heart of abnormal configuration and often a rim of calcium at the periphery. The aortic knob is absent or flattened and deformed. Fluoroscopic examination reveals the excursions of the margins to be diminished to the point that the heart seems almost to be standing still. When the patient is tilted from side to side the heart remains fixed in the mid-line and fails to elongate when the diaphragms move downward. Pulmonary congestion is usually evident, pleural thickening or effusion and extrapericardial adhesions, deforming or imparting abnormal motion to the diaphragm, may be found. The kymogram confirms the marked decrease in the amplitude of pulsation over the borders of the heart and of the aorta. Calcification is the most reliable sign of chronic constrictive pericarditis, especially when the cardiac silhouette is enlarged, but is present in less than half of the cases, and when present does not always indicate constriction of the heart. It is sometimes visible under the fluoroscope, but is best demonstrated in lateral radiographs and occasionally

heavy exposures are necessary to demonstrate its presence. The size of the cardiac silhouette, when small, is of considerable importance, but a marked increase in size or evidence of cardio-vascular disease of other etiology (hypertension and arteriosclerosis, for example) does not necessarily rule out the diagnosis of chronic constrictive pericarditis. In these cases the diagnosis is more difficult, but can usually be made from the composite radiological and clinical pictures. The X-ray kymogram is of considerable aid in the diagnosis, especially in the study of the pulsations along the aorta and right border of the heart, where the amplitude of pulsation was found to be most regularly reduced. In addition to the reduced amplitude of pulsation, flattening and irregularity of the diastolic peak of the wave are sometimes helpful but less important findings. Pulsations of normal or greater than normal amplitude may be seen over portions or over all of the left border. No constant changes in the size or the appearance of the cardiac silhouette or of the aorta were observed following operation. Some hearts became larger, others small. Increase in the amplitude of pulsations in the kymogram were regularly seen over portions or over all the cardiac silhouette, but could not be related to the degree of relief afforded by pericardectomy.

"Stress" or "Fatigue" Fractures of Bone.

J. BLAIR HARTLEY (*British Journal of Radiology*, September, 1943) states that the terms "stress" or "insufficiency" or "fatigue" fractures should be reserved for those conditions in which partial or complete fracture can be shown radiologically to have occurred in apparently normal bone, or in which submicroscopic or molecular fracture can be inferred to have taken place either by the callus formation early in the case, or by the subsequent radiological and clinical progress. There must be no evidence of systemic disease of a nature known to be associated with, or causative of, bony pathological change, nor must there be a history of violence. The characteristic feature is always callus formation. This varies from case to case; most commonly it is localized to one side and is seen first in the form of a tiny bead, but in some instances it does spread along or round the shaft to a greater degree. It always develops quickly, organizes, and then usually leaves the bone structure stronger or thicker. Most frequently it occurs at a site at which torque, stress or overload can be demonstrated to occur; for example, in the tibia it is seen most frequently at the point postero-medially where the "axis of vertical stress" through the internal condyle cuts the cortex. Exceptions to this rule are noted in the *os calcis* and in the neck of the femur. In many cases a crack or a definite fracture line is demonstrable at some stage, not necessarily at the onset of symptoms nor usually within two weeks. The most usual time to demonstrate it is about three weeks from the onset of pain. The majority of authors are agreed that this is true. It is of the utmost importance that a careful search be made of radiographs in which the diagnosis of "stress" fracture may be suspected, for the detection of a clean nick in the cortex, or a hair-

like fracture line, does make it possible to eliminate the suspicion of sarcoma or of Ewing's tumour, precisely because in "stress" fracture the infraction line appears relatively early, whereas should pathological fracture occur in bone tumour, it will be relatively late or associated with trauma. Rapid organization of callus, the formation of a zone of sclerosis or the rapid healing of the fracture site are normal to the condition, provided adequate rest from stress obtains. All these findings are of good prognostic significance. Should a transverse area of osteoporosis develop, extending across the bone, this is of bad prognostic significance. It means that over-stress had persisted too long after the "bone fatigue" stage had been reached, and that (a) recovery will be slow—months instead of weeks, and (b) there is the danger of complete fracture supervening, as occurred in one of the author's tibial series. In this case, the patient being a soldier, the diagnosis was missed, and "rest" to the fatigued bone was inadequate. No abnormality will be found either in the affected bone or elsewhere in the bony skeleton, with the exception that the condition is occasionally demonstrated bilaterally—an important feature to bear in mind.

PHYSICAL THERAPY.

Causalgic States following Injuries to the Extremities.

G. DE TAKATS (*Archives of Physical Therapy*, November, 1943) describes causalgic states following injuries to the extremities. He thinks that these conditions, especially the mild and abortive forms, are more frequent than is generally supposed. Among the names used to describe this condition are traumatic oedema, acute bone atrophy, Sudeck's atrophy, post-traumatic osteoporosis, peripheral trophoneurosis, minor causalgia and reflex dystrophy. The causalgic state begins soon after injury. The injury is usually mild and occurs around the wrist, ankle or small joints of the hand or foot where there are no masses of muscle and where nerves are abundant and superficial. The patient complains of burning and paroxysmal pain, though his limb is properly immobilized, non-infected and apparently on the way to normal repair. In this stage the extremity is warm and oedema is present; the muscles are in a hypertonic state. The pain is limited to the site of the injury. In a second stage the extremity is not so warm and flushed, but may become hard, cyanotic and cold to the touch. Strips of warm, dry skin, corresponding with sensory distribution, are surrounded by a marginal hyperhydrosis. The joints become stiff and the pain spreads in a proximal direction. A spotty bone atrophy becomes evident. Finally, the skin becomes atrophic, the joints are stiff, the muscles are atrophic and a diffuse osteoporosis appears in the films. The pain has become more severe. The author discusses the nature of the vasomotor disturbance and also the diagnosis. He accepts the working hypothesis that the syndrome is a result of the irritation of posterior nerve dilators secreting a

diffusible chemical substance, and adds that treatment must be directed against further aggravation of this mechanism. He points out that the usual methods of physical therapy, such as the use of heat, massage and passive exercises, invariably aggravate this syndrome. Initial rest, relief of pain by nerve block and the cautious use of cool baths, followed later by more vigorous physical therapy under the protection of nerve block, are recommended for treatment. In the late stages the condition is intractable and even root section or cordotomy may not help it.

Infra-Red Therapy of Flash Keratoconjunctivitis.

D. G. COGAN, V. E. KINSEY AND P. DRINKER (*The Journal of the American Medical Association*, December 4, 1943) state that the increase in flash keratoconjunctivitis from exposure to welding arcs has revived interest in the treatment of the condition. They have produced keratoconjunctivitis in rabbits by exposure to a mercury vapour arc. After the establishment of doses which would result in reproducible signs, alternate eyes were treated by means of a therapeutic heat lamp. No evidence was obtained that this form of treatment benefited the condition.

Treatment of Carcinoma of the Cervix Uteri.

H. DOBNEY KERR in an editorial (*Radiology*, May, 1943) expresses the opinion that if a generalization is warranted regarding the treatment of any malignant neoplasm, it is that carcinoma of the cervix should always be treated by irradiation. This is the teaching in all the reputable medical journals and medical schools, and the judgement of those physicians who have the most to do with the care of the disease. This means that the competent radiologist or the gynaecologist trained in irradiation therapy should treat all proved cases of cervical carcinoma. These practitioners must have had training and experience, and must be conversant with the physical factors that affect depth dose, and be able to estimate with a reasonable degree of accuracy the amount of irradiation delivered to the tumour. Not only should this be true for external irradiation, but also for transvaginal Röntgen therapy and intrauterine application of radium. The term "milligramme hours" is not in itself a true indication of radium dosage. Since at present it must be assumed that effect on the tumour is dependent primarily on delivered radiation, it is necessary to use every available means to increase this amount within the limits of tolerance of normal tissue. More and more must it be realized that adequate irradiation for carcinoma of the cervix is a major procedure, and that to increase the percentage of five-year survivals, the complications in the form of skin, bowel and bladder reactions resulting from the treatment must be increased. The possibility of the development of these complications should not deter the clinician from giving maximum doses. This attitude has enabled some radiologists to increase the five-year survivals 100% in the past ten years. With heavy irradiation it is now possible to expect up to 40% five-year survivals when all groups are taken together.

British Medical Association News.

MEDICO-POLITICAL.

A MEETING of convocation of the Victorian Branch of the British Medical Association was held at the Royal Australasian College of Surgeons, Spring Street, Melbourne, on Friday and Saturday, January 28 and 29, 1944, Dr. H. C. COLVILLE, Chairman of Council, in the chair.

Dr. Colville, in welcoming the delegates on behalf of the Council, explained that convocation was the body which determined matters of policy for the Victorian Branch. It was a democratic body, in that it included among its members representatives of all the subdivisions of the Branch as well as members of the Council. A meeting of convocation was rare in the history of the Branch. The previous meeting had been held in 1936, to consider the attitude of the Branch on the question of national health insurance. Dr. Colville also explained that the agenda paper before the meeting would be followed strictly to the exclusion of every other matter—no member might introduce a fresh subject for discussion. He pointed out that the agenda paper was divided into several parts. There was an introductory section, which dealt with the medical service generally. Then followed a section in which would be considered the policy of the Branch in regard to a national medical service. After this came a section in which policy would be discussed with regard to the possible introduction of a national medical service by the Government. The last section concerned the policy in regard to a national medical service conducted on a fee-for-service principle.

The list of representatives comprised 94 persons. Of these, 40 comprised members of the Council and executive officers of the Branch, and the remainder came from the several subdivisions. The proceedings were marked by a freedom of discussion, in which very many of those present took part, and occasionally the voting was so close that a division was necessary. Some of those who were prevented from attending by the demands of practice gave proxies to other members. The result was that once or twice during the proceedings some difficulty was experienced in obtaining a quorum. According to the rules of convocation, half the number of representatives constituted a quorum.

The motions in the first section of the agenda were moved on behalf of the Council by Dr. John Dale, the Senior Vice-President. After adopting its first resolution, which was purely formal, the convocation declared that it was willing and anxious to cooperate with the Government in bringing about certain improvements in the existing forms of medical service to the community. In the succeeding resolution it averred that the optimum efficiency of medical service to the people would be provided by the existing consultant, general practitioner and hospital services, with all adjuncts and certain necessary additions which it set out *seriatim*. These additions were along similar lines to those adopted by the Federal Council at its last meeting in 1943.

In the second section of the agenda paper, that dealing with a national medical service, some of the motions were moved by Dr. Roy Watson, Honorary Secretary of the Branch, and others by Dr. John Dale. In this section the convocation defined a national medical service as an arrangement whereby the whole or a substantial section of the community was entitled to receive the whole or part of its general medical care at the expense of the Government. The convocation then proceeded to enumerate the essential features of a national medical service. It determined first of all that while the health of the community was a national matter, there should be a duty on every individual to accept a moral and social responsibility for his own health, for that of his dependants, and for the health of the community. In the words of convocation, this was to be "one of the basic principles in any medical service".

It was then determined that in any scheme for the extension of government control over existing general medical services to the community, or for the addition of government-controlled services to those already in existence, certain principles should apply. These were as follows: (a) Administration should be on a State basis. (b) Administration should be in the hands, not of a government department, but of a corporate body, which should be composed partly of medical practitioners, who should constitute a majority of the corporate body elected by the practising profession, and partly of non-medical members "of knowledge and experience in health matters, nominated on a non-political basis". (c) Administration should not be in the hands of friendly societies or comparable bodies. (d) Disciplinary control of members accepting service under the

scheme should be exercised by members of the medical profession only. (e) If the scheme destroyed or depreciated the equity of the medical practice of any individual or group of individuals, adequate financial compensation should be made. (f) Certificates, forms and prescriptions of non-participating doctors should have the same validity as those of doctors who were participating.

In further reference to a national medical service, convocation decided that any reorganization of medical practice should be administered on a State basis; that the principle of free, reciprocal choice of doctor and patient was an essential feature of any service; that a complete service should be available to all without regard to income; and that any scheme for a national medical service should be financed by a special fund.

In the third section, which dealt with the possible introduction of a national medical service by the Government, motions were proposed on behalf of the Council by Dr. Guy Springthorpe, Dr. E. M. Ettelson, Dr. Charles Byrne (members of the Council), Dr. John Dale and Dr. David Roseby (President).

Convocation first of all declared its opposition to a nationalized, salaried service, on the ground that it was not in the public interest that the medical profession should be converted into a salaried branch of government service. It also decided that it was opposed to any extension of contract practice on a capitation basis. Convocation then declared that in any national medical service payment of doctors should be on a fee-for-service principle, but added that this did not necessarily mean that in its opinion other existing methods of payment for medical service should be abolished.

Convocation next discussed the possible introduction of a national medical service during the war, and expressed the view that no such service should be introduced during the war or for twelve months afterwards. In regard to discussion on a national medical service, convocation decided that no move should be made by the Branch during the war or for twelve months afterwards to take the matter up with the Government. At the same time, it was made clear that its decision should not prevent such discussion if it was initiated by the Government. It added that no such move should be made after the prescribed period until or unless it was sanctioned by a future meeting of convocation.

In further discussion of the matter, the convocation expressed three "desires". The first was that the medical profession should not be committed either in principle or in detail to any form of national medical service before details had been considered by the profession. The second was that the Government should be asked not to place before Parliament any proposals for a national medical service before details had been considered by the profession. The third was that any attempt by the Government to introduce any scheme for a national medical service without the approval of the medical profession should be opposed.

The final motion in the third section of the agenda had to do with a fee-for-service system, and it was agreed that this type of system should be discussed before the motion was considered. Convocation therefore proceeded to the final portion of the agenda paper, which, as already stated, had to do with the policy that should be adopted regarding a national medical service conducted on the fee-for-service principle. This part of the agenda paper was based on the fee-for-service system advocated by Dr. Charles Byrne in his book "Proposal for the Future of Medical Practice: An Analysis of Proposed Schemes for a National Health Service and an Outline of a Scheme to Provide a Complete Medical Service for the Whole Population". The whole matter was discussed at some length and in considerable detail, and after a decision had been reached on all points, convocation returned to the previous section of the agenda and adopted a resolution stating that the scheme for a national medical service on a fee-for-service system should be regarded only "as one acceptable substitute for any unacceptable scheme proposed by the Government".

Medical Societies.

THE PUBLIC MEDICAL OFFICERS' ASSOCIATION OF NEW SOUTH WALES.

THE annual meeting of the Public Medical Officers' Association of New South Wales was held at British Medical Association House, 135, Macquarie Street, Sydney, on

January 27, 1944. Dr. Sibyl Bevan presided and 21 members were present.

Dr. C. E. Percy presented the financial statement for 1943, which showed a credit balance on the year's operations and accumulated funds of £614.

Annual Report.

Dr. H. H. Willis, on behalf of the committee, presented the annual report as follows:

1. The continuance of the war has obliged the Association to remain passive during the year 1943. The Association has been held together ready for energetic action on conclusion of hostilities.

2. There are now 104 members of the Association, of whom seven, having retired from the services, are honorary members.

3. The committee met six times during the year, attendances of members being as follow: Dr. Sibyl Bevan (President) 6, Dr. E. Percy 5, Dr. G. C. Smith 5, Dr. J. McManamey 3, Dr. A. T. Edwards 3, Dr. S. Evan Jones 5, Dr. Dorothy McClemons 6, Dr. Edelsten Pope 3, Dr. H. M. Taylor 1, Dr. H. H. Willis 6.

4. In February, 1943, Dr. H. H. Willis represented us at a convention of medical practitioners summoned in Sydney by the New South Wales Branch, British Medical Association, and expressed—as instructed by our last annual meeting—approval of the establishment of a salaried medical service to care for the health of the people of Australia. Subsequently, by direction of the committee, he gave evidence before the Parliamentary Joint Committee on Social Security, and expressed somewhat similar views.

5. There has been little change in the relationship between this Association and the New South Wales Branch, British Medical Association. As adequate support was not offered by other branches of the profession, a public medical officer was not nominated at the annual election of the Council of the New South Wales Branch, British Medical Association. For several years our secretary has been co-opted as a member of the Medical Politics Committee. This has partly overcome the difficulties arising from the absence of any public medical officer from the Branch Council. This year, for the first time, our committee was asked to nominate a representative on the Medical Politics Committee. Dr. Willis was chosen.

The committee supported the candidature of Dr. Marie Hamilton, a former member of this Association, and it is noted with satisfaction that she was elected as a member of the Branch Council of the British Medical Association in this State.

A check of our roll with that of the British Medical Association in April, 1943, showed that of 107 members, 75 were also members of the British Medical Association.

6. It was noted with regret that a new position in the New South Wales Division of Maternal and Baby Welfare was created during the year at a quite inadequate salary. It was noted with some satisfaction that this salary was increased by £50 at the biennial review of salaries shortly afterwards.

7. The long-standing grievance of medical officers in State hospitals concerning so-called privilege leave has received further consideration during the year and has been adjusted satisfactorily.

Office-Bearers.

The following office-bearers were elected for the year 1944:

President: Dr. J. Grahame Drew.

Honorary Secretary: Dr. H. Hastings Willis.

Honorary Auditor: Dr. S. McGeorge.

Committee: Dr. Edelsten Pope and Dr. Dorothy McClemons (Education Department), Dr. J. McF. Russell (Works and Railways), Dr. A. T. Edwards and Dr. S. Evan Jones (Mental Hospitals), Dr. C. E. Percy, Dr. J. McManamey and Dr. G. C. Smith (New South Wales Health Department), and Dr. H. H. Willis (Repatriation Department).

Other Matters.

Dr. A. T. Edwards reported the action taken by a representative committee of service associations to secure restoration of the New South Wales Superannuation Fund to its original sound basis. It was decided to make representations to the Minister for Health on the matter.

There was a general discussion on the Federal Government's proposal for a national medical service.

Vote of Thanks.

The meeting closed with a vote of thanks to Dr. Bevan for her services as President during the year.

Hospitals.

THE MENTAL HOSPITALS OF VICTORIA.

THE report of the Director of Mental Hygiene of Victoria for the year 1942 is to hand; the report bears the date of August 16, 1943, and was received in November. At the end of the year under review the mental hospitals of Victoria housed 6,334 patients, a decrease of 29 over the number for 1941. The number of patients under the department's control decreased by 84, and at December 31, 1941, the number of registered insane persons in the State of Victoria totalled 7,315. The Director of Mental Hygiene states that the ratio of certified insane persons to the general population is one in 269. During the year 752 persons were received under the voluntary boarder provisions of the act; of these, it was necessary to detain only 112 as being certifiably insane.

In the details given of the activities of the various State mental hospitals and institutions coming within the scope of the mental defectives branch, several points come to notice. The first is the fact that overcrowding is still rife, and that severe shortage of nursing staff has laid a heavy burden upon those who remain. In this connexion the Director points out that at one stage nearly 200 vacancies for nurses existed, and that such a state of affairs is detrimental to both patients and staff. Those nurses are fortunate who can take one-half of their leave. The Director pays a tribute to the nurses who are carrying on; he considers that the value of their services cannot be estimated according to monetary standards, and that an extended period of leave should be granted to them as soon as conditions permit. A small amount of new construction was undertaken during the year under review; but in view of the staff deficiencies it was impossible to utilize the extra accommodation.

The Director also refers to an amendment of the act passed towards the end of the year, which enables the department to detain a patient in a receiving house or ward for a period of three months instead of two. The longer period gives the medical staff an opportunity of completing the treatment of patients without having to send them home at an early date or to have them certified and committed to a mental hospital. The Director points out that the latter procedure should be avoided as far as possible, and as long as any improvement is occurring in the patient's mental state. He urges the establishment of a "voluntary hospital", the need for which is likely to be accentuated by the increase in "nervous disorders" resulting from war conditions. A large number of voluntary patients were being treated during the year under review; it is therefore considered desirable that accommodation should be provided for them apart from certified patients. Moreover, a "voluntary hospital" would encourage patients to come for treatment in the early stages of their disability.

From the pathological aspect, it is reported that during the year under review Wassermann tests were made of the blood of 1,481 patients, and 1,886 analyses of urine were carried out. Many other tests were completed and vaccines prepared at the request of medical officers. A special investigation into the causation of asylum dysentery resulted in the discovery of eleven carriers. The pathologist made 303 post-mortem examinations, and he reports "with satisfaction" that electric refrigerators were installed in the different laboratories. On the dental side, it is stated that 1,372 patients were treated; dentures were made for 85 patients, and 284 repairs to dentures were done. The dentist expresses the hope that the improvement in diet, which is being effected on the advice of the dietitian, will lead to an improvement in the condition of the patients' teeth.

It is gratifying to learn that a number of the children in the care of the department have been placed in positions in industry and appear to be giving satisfaction to their employers. Some of these children return to the institution after their day's work; others who are employed on farms return to the institution for the week-end; others again are housed in a hostel. Some boys have been able to attend a technical school for training. The health of all the children has been good.

Finally, accounts are given of the agricultural activities in operation at the various institutions, and it is obvious that impressive amounts of vegetables *et cetera* have been produced, with resulting improvement of the diet of the patients. Incidentally, it may be noted that from one children's institution 24 pounds of cleaned onion seed were sent to the organizers of the "Seed for Britain" scheme. At the time when the report was tabled, steps were being

taken to modernize or reerect the dairies attached to the institutions, as some of them were "open to criticism". The Director acknowledges gratefully the help and advice given by officials of the Department of Agriculture; their assistance has been of value in improving the gardening, dairying, pig-raising and other activities of the hospitals.

National Emergency Measures.

THE PROVISION OF DOMESTIC HELP FOR DOCTORS.

THE following information is published at the request of the Secretary of the Central Medical Coordination Committee.

The Central Medical Coordination Committee has been in correspondence with the Director-General of Manpower concerning the provision of domestic servants for the medical profession.

It was represented to Mr. Wurth that the number of medical men left to care for the civil community was barely sufficient to cope with the demands on their services, and that the efficiency of these remaining practitioners was being impaired by the lack of necessary domestic assistance and surgery attendants. The remedy suggested was that doctors' practices should be declared protected undertakings, as was done in the case of public hospitals.

The Director-General regretted that he was not in a position to take the action suggested. He, however, addressed the following circular memorandum to all his deputies on December 6, 1943:

DOCTORS' DOMESTIC SERVICE.

I refer to my memorandum dated 7th September, 1942, regarding the allocation of domestic staff to the medical profession. Further representations have been made to me by the Central Medical Coordination Committee concerning the difficulties still being experienced by doctors through their inability to secure domestic staffs and surgery attendants.

It has been pointed out that the efficiency of civilian medical practitioners is being impaired by the lack of necessary staff. I desire that every effort shall be made to provide essential domestic service to meet the staffing requirements of the medical profession.

Correspondence.

TREATMENT OF PERSISTENT UPPER RESPIRATORY INFECTION.

SIR: The paediatric abstract in the current journal under the heading of "Treatment of Persistent Upper Respiratory Infection" interested me very much.

About three or four years ago one was tantalized by the idea of a nasal spray using the sulphonamides; technical pharmaceutical difficulties were great and have continued to be so, as is evident from Taylor's article. I early became convinced that such benefits as were obtained were due to the vasoconstrictor effect of the ephedrin used and a minute or two's reflection will confirm this—the spray affects the corridor only and not the rooms opening off it, that is, the sinuses where the infection is persistent and inaccessible.

I have long been satisfied that the only effective use of the sulphonamides in upper respiratory infections is by mouth, and that it will pay rich dividends.

My practice now is—in mild cases—to confine the child to bed over a period of five or six days and give adequate dosage of "693" or "760". In severe cases of longer standing with gross X-ray changes in the sinuses hospitalization is advisable for fourteen to twenty-one days with two or three full courses of the drug followed by small maintenance doses. The latter may be continued after the child leaves hospital in the same way that the rheumatic child is treated. In all cases the blood picture is carefully supervised. As soon as clinical improvement is observed, then short-wave diathermy to the sinuses is begun and continued for at least a fortnight. At the end of this time a single chin-needle film will decide whether further treatment is necessary. In early cases, that is, of not more than a month's standing, it is amazing how quickly the X-ray picture changes on sulphonamide alone. With long-standing cases resolution is slower, but quite often complete, provided, of course, one excludes obviously unsuitable cases. With the pendulum

swung over towards normal physiology, the difficulty is to keep it there. Hygiene and dietetic factors must be carefully controlled; ventilation of post-nasal space must be adequate and chronically infected tonsils removed. There is a great deal more that could be said, but it is beyond the scope of a note such as this which merely purposes to register the changes that are, and for some time have been, coming over the treatment of sinusitis.

Yours, etc.,

JOHN H. SHAW.

14, Parliament Place,
Melbourne, C.Z.,
January 24, 1944.

A NOTE ON THE BLOOD SEDIMENTATION TEST.

SIR: In a recent communication to the Victorian Pathological Society, I reported, *inter alia*, on the blood sedimentation rate observed in 200 fatal cases of pulmonary tuberculosis. Of these, fourteen gave a reading considered within the limits of "normality, or quiescence", as defined in the method adopted (Cutler's technique). Another case has come to my notice lately which is of interest in this respect.

A male patient, aged forty-four years, was admitted to Grisswell Sanatorium with pulmonary tuberculosis, and died four days later. He was very ill, markedly emaciated, and too weak to be submitted to a satisfactory physical and radiographic examination.

Blood examination showed the following:

Blood sedimentation rate (Cutler): 5 millimetres one hour.

Room temperature 74° F.

Red blood cells: 2,000,000 per cubic millimetre.

White blood cells: 10,000 per cubic millimetre.

Hæmoglobin (Sahli): 38%.

Film: no gross abnormality seen.

Autopsy examination showed an advanced degree of pulmonary tuberculosis, and tuberculous ulceration of the small intestine.

The point of interest in this case is the slow velocity of blood sedimentation, apparently related neither to the clinical condition of advanced, active disease, nor to the degree of anæmia observed. The viscosity of the plasma was not measured, but the influences said usually to mask the blood sedimentation rate reading, that is, polycythæmia and congestive cardiac failure, were not present. This record is not in accordance with the oft-quoted—"a normal rate indicates either health, or a disease so mild and localised, that the rate is unaffected" (Whitby and Britton, 1937: "Disorders of Blood").

Yours, etc.,

DAVID B. ROSENTHAL.

Grisswell Sanatorium,
Mont Park,
February 15, 1944.

DYSHIDROTIC AFFECTIONS OF THE FEET.

SIR: In his article "A Record of Common Skin Diseases at a Royal Australian Air Force Hospital" in the journal of February 5, Flight Lieutenant Colahan, under the sub-heading "Dyshidrotic Affections of the Feet", expresses somewhat reactionary opinions, which as far as can be gathered from the text appear to have been based on hasty and possibly erroneous conclusions.

He does not say how often any given case was examined for the presence of fungus, but several negative findings, even in suitable cases, are needed to exclude this infection, and where fungicides, especially greasy ones such as Whitfield's ointment, have been used, such a search is useless unless some days are allowed to elapse in which no anti-septic treatment at all has been employed.

The fact that "energetic fungicidal treatment" causes exacerbation of the condition is not evidence that the primary cause is not a fungus. In Calcutta, where this condition of the feet is almost universal and self-treatment is rife, it was a common experience to see cases exhibiting severe inflammatory reaction from application of an unsuitable remedy or a suitable one at the wrong time, and before any headway could be made soothing non-specific treatment had to be employed.

The treatment outlined by Flight Lieutenant Colahan is very similar to that I have employed for many years in such cases, and the fact that a cure is effected by such means is not evidence that the cause was not a fungus. It should be noted that at one stage (the correct one) he uses a powerful fungicide in the treatment of what he

claims is dyshidrosis or hyperhidrosis without fungous infection. I refer to gentian violet, and I suggest he might get even better results if he were to double the strength of this dye, or better still, to add brilliant green in the same strength to his preparations, because in laboratory tests on *Epidermophyton floccosum*, the organism in question, I found that a mixture of equal parts of these two dyes was over twelve times as powerful as gentian violet and nearly twice as powerful as brilliant green alone. These results were later confirmed by carefully controlled clinical observation.

Yours, etc.,

PHILIP A. MAPLESTONE,
Honorary Dermatologist, Royal
Hobart Hospital.

Lachlan Park Hospital,
New Norfolk,
Tasmania.
February 9, 1944.

"WELLCOME" INSULIN.

SIR: We are pleased to announce that the period of availability of our insulin products has been extended as follows:

"Wellcome" Insulin: from eighteen months to two years.
"Wellcome" Protamine Insulin (with Zinc) Suspension: from twelve months to two years.
"Tabloid" Sterile Hypodermic Insulin Hydrochloride: from eighteen months to two years.

It may be some time before newly printed packings with the revised labelling can be made available, but meanwhile it can be taken that the period of availability is two years from date of issue irrespective of what is printed on the carton.

The cooperation of prescribers in this matter will be appreciated.

Yours, etc.,

BURROUGHS WELLCOME & CO. (AUSTRALIA) LTD.
Creasy Street,
Rosebery,
New South Wales.
February 16, 1944.

THE WOMEN'S HOSPITAL, CROWN STREET, SYDNEY.

SIR: To mark the occasion of the fiftieth anniversary of the Women's Hospital, Crown Street, Sydney, the directors have launched a "Special Golden Jubilee Rebuilding Appeal".

The objectives are, firstly, to secure funds for the completion of the Nurses' Home, commenced in 1939. The Lady Gowrie has graciously consented to this being called "The Lady Gowrie Nurses' Home". Secondly, the rebuilding of the hospital, which has been hopelessly overcrowded for years. There are many doctors who have been students and residents at the Women's Hospital who may feel a desire to help in this worthy cause.

The claims for appealing to all for help at this time may be set out as follows:

1. The Women's Hospital, Crown Street, was the first, and still is the foremost, women's hospital in New South Wales.
2. Over 400,000 patients have been treated and over 64,000 babies have been born at the Women's Hospital. Last year 3,882 babies were born there. Today one in every six babies born in the metropolitan area of Sydney begins life there. Over 2,500 nurses have been trained in maternity nursing and twice that number of medical students received their grounding in obstetrics.
3. It is the proud boast that "Crown Street never turns a patient in labour away".
4. During the seven years commencing July 1, 1936, 19,765 women classified as "booked cases" have been delivered in the hospital. Thirty-one died, giving a mortality rate of 1.56 per 1,000 among women who have attended the antenatal department at least once and then been delivered within the hospital.
5. The Women's Hospital is today rendering important national service to the community by reason of the fact that over 50% of the babies born thereat are the children of members of the fighting services.
6. Seven years ago the Board of Health, at the instigation of a committee convened by the Council of the New South Wales Branch of the British Medical Association, agreed to

establish a mobile blood transfusion service, by means of which a trained team, doctor and nurse, was always available to go to the help of any doctor in the Sydney metropolitan area in a case of severe hemorrhage in childbirth. Of the hospitals approached, the Women's Hospital was the first and only one to agree to pioneer a mobile blood transfusion service. As a result of this many lives have been saved.

7. Among similar hospitals in New South Wales it was the first to see the need of an X-ray department in obstetrics, and to provide a sterility clinic. It led the way in the appointment of an almoner. In the clinical realm the medical staff has pioneered the latest methods of treatment and the use of up-to-date equipment.

Anyone interested in this appeal can forward donations or inquiries to G. A. Wilson, Organizing Secretary, Appeal Office, 3rd Floor, Trust Building, 155, King Street, Sydney, 'phone M 2630, Box 1921, G.P.O., Sydney.

Yours, etc.,

H. Y. BRADDON, President;
ALFRED J. GIBSON, Senior Honorary
Obstetrician and Gynaecologist.

The Women's Hospital,
Crown Street, Sydney.
February 17, 1944.

THE PRESCRIBING OF IRON AND AMMONIUM CITRATE.

SIR: Since the introduction of the modern practice of prescribing massive doses of iron and ammonium citrate, a common way of ordering it is in the form of a "saturated solution". The object of this note is to call attention to the fact that such prescriptions may be dispensed with varying amounts of the substance, and the resultant lack of uniformity may lead to the prescriber's disappointment and other undesirable results.

According to the British Pharmacopoeia iron and ammonium citrate is soluble in 0.5 part of water. This statement appeared in the 1898 issue and has been repeated in every issue since then. It is hardly a true statement of the fact, for iron and ammonium citrate, like treacle, malt extract or gelatin, is a somewhat indefinite colloidal material which will mix with water in all proportions; there is no definite point at which there remains undissolved solid. Experiment shows that if 100 parts are mixed with either 50, 30 or even 15 parts of water, homogeneous products are obtained, varying only in their fluidity (the third being pitch-like), and there appears to be no reason why the British Pharmacopoeia should have chosen the first of these figures.

Inquiry among pharmacists, both in ordinary and in hospital practice, shows that in the absence of a satisfactory guide, different interpretations are adopted. If 100 parts of the material are dissolved in 50 parts of water, the resulting solution measures practically 100 fluid parts. In some cases this is what is dispensed; in other cases 100 parts are dissolved in sufficient water to make the resulting solution up to 200 fluid parts.

It is therefore suggested that, in the interests of uniformity, prescribers should cease to employ the misleading term "saturated solution" in prescribing this substance, but should adopt one of the following strengths according to circumstances.

1. *One Grain in One Minim.*—Iron and ammonium citrate, 480 grains; chloroform water, to one fluid ounce.

2. *One Grain in Two Minims.*—Iron and ammonium citrate, 480 grains; chloroform water, to two fluid ounces.

Blank minims (by minim measure) to be taken with (blank) water *et cetera*.

The chloroform water will preserve the solution, although such strong solutions do not usually require it.

Yours, etc.,

HORACE FINNEMORE, F.R.I.C.,
Reader in Pharmacy, University
of Sydney.

February 17, 1944.

OVARIAN CYST COMPLICATING TWIN PREGNANCY.

SIR: A patient engaged me for confinement when three months pregnant. She returned for her routine examination three weeks later, when her systolic blood pressure was 140 millimetres of mercury and her diastolic pressure 80. No abnormality was detected in the urine. The patient's abdomen appeared too big for a four months' pregnancy.

I examined her about two weeks later; her systolic blood pressure had risen to 150 millimetres of mercury. An X-ray examination revealed the presence of twins.

When the patient was seven months pregnant her systolic blood pressure had risen to 170 millimetres of mercury and her diastolic pressure to 100. Her general condition was good, and she did not complain of headache or giddiness; no oedema was present and no abnormality was detected in the urine.

When she was eight and a half months pregnant her systolic blood pressure reached 200 millimetres of mercury, in spite of the fact that she had been kept in bed for three weeks. It was decided to induce labour medically. She was delivered of twins, a boy and a girl. On the following day the systolic blood pressure fell to 160 millimetres of mercury and the diastolic pressure to 90; but on the day after the systolic pressure again rose to 190 millimetres of mercury. The patient felt well. However, examination of her abdomen revealed the presence of fluid, and under both axillae appeared swellings the size of an orange, which seemed to contain fluid. Her temperature was normal and her urine output was more than her fluid intake. A section of a lump in the axilla was taken, and the specimen was found to be residuary mammary tissue, part of the axillary tail. I performed *paracentesis abdominis* and withdrew twelve pints of yellow, transparent fluid. The fluid had a specific gravity of 1.016; the urea content was normal, and it contained a trace of albumin, some erythrocytes and no lymphocytes. A blood count revealed that erythrocytes numbered 5,000,000 per cubic millimetre and lymphocytes 7,600 per cubic millimetre; the appearances in a blood smear were normal. The patient was discharged from hospital after three weeks and asked to report again in one or two weeks. Examination revealed reappearance of fluctuation. A tumour could be felt in the mid-line; it was well circumscribed and occupied an area of a seven months pregnant uterus. Dr. P. W. Rice performed operation and found a large ovarian cyst with a long pedicle; he removed the cyst without difficulty. The cyst contained eight pints of fluid.

The other possible diagnoses which had been considered in addition to ovarian cyst were hydronephrosis and neoplastic formation, ascitic form of tuberculosis. It is noteworthy that a completely normal delivery was possible, in spite of the presence of a large ovarian cyst and without rupture of the cyst.

The patient made an uneventful recovery.

Yours, etc.,

C. J. HELMAN, M.B.

137, Beach Road,
Mile End,
Adelaide.
Undated.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Taylor, John Russell Robert, M.B., B.S., 1939 (Univ. Melbourne), Regent's Court, Springfield Avenue, Potts Point.
Arnheim, Robin Frederick Gordon, M.B., B.S., 1941 (Univ. Sydney), 1, Greengate Road, Killara.
Harrison, Francis William, M.B., B.S., 1941 (Univ. Sydney), 62, Cumberland Street, Cessnock.
Lipscomb, Bertram Mark, M.B., B.S., 1943 (Univ. Sydney), "Camberley", Edgecliff Square, Edgecliff.

The Royal Australasian College of Surgeons.

MEETING OF THE BOARD OF CENSORS.

THE next meeting of the Australian Board of Censors of the Royal Australasian College of Surgeons will be held at the College, Spring Street, Melbourne, probably in May, 1944. Candidates who desire to present themselves at this meeting should apply to the Censor-in-Chief for permission to do so on or before March 31, 1944. The appropriate forms are available at the College, Spring Street, Melbourne, and at the offices of the various State secretaries.

Obituary.

BENJAMIN PETER DONALD.

WE regret to announce the death of Dr. Benjamin Peter Donald, which occurred on February 15, 1944, at Toorak, Victoria.

HORACE LEIGH DECK.

WE regret to announce the death of Dr. Horace Leigh Deck, which occurred on February 20, 1944, at Haberfield, New South Wales.

Diary for the Month.

- MAR. 1.—Victorian Branch, B.M.A.: Branch Meeting.
MAR. 1.—Western Australian Branch, B.M.A.: Council Meeting.
MAR. 2.—New South Wales Branch, B.M.A.: Special Groups Committee.
MAR. 3.—Queensland Branch, B.M.A.: Branch Meeting.
MAR. 3.—Victorian Branch, B.M.A.: Legislative Subcommittee.
MAR. 7.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
MAR. 7.—New South Wales Branch, B.M.A.: Organization and Science Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such a notification is received within one month.

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